

# THE IRON AGE

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## Blast Furnaces Going Out

### A Net Loss of 19 in the Active List

## Business in Finished Lines Falling Off—Basic Iron Weaker

Our pig iron statistics for April show that the iron trade more than retraced last month the forward steps it took in March, and the pace of recession was rapid as April closed. With 212 coke and anthracite furnaces in blast May 1, or 19 less than one month previous, the country was producing at the rate of 64,432 tons a day against 70,752 tons on April 1 and 66,562 tons on March 1. Production is now at the rate of 23,850,000 tons a year, estimating charcoal iron, whereas one month ago the yearly rate was 25,750,000 tons. In the 30 days of April the output of coke and anthracite iron was 2,065,086 tons, or 68,836 tons a day, against 2,171,111 tons in March, or 70,036 tons a day.

Most of the furnaces which went out last month stopped in the second half. Steel companies show a net loss of 15 furnaces, against four for the merchant producers. One western Pennsylvania company had but two furnaces in blast May 1, against eight one month previous. The Steel Corporation now has 63 per cent. of its furnace capacity active, against 72 at the high point late in March. Several merchant furnaces will go out in the next week or two.

Pittsburgh reports that new business in finished lines has been falling off steadily. There is considerable unevenness, however, taking the trade as a whole, one day's total running up, to be followed by several of very meager bookings. The Steel Corporation's new orders have been averaging 25,000 tons a day lately. No new influences have come into the price situation, nor is any development expected from the steel manufacturers' conferences in New York this week.

The Rock Island has bought 8000 tons of rails for its St. Paul and Des Moines line. The Florida East Coast has placed 14,000 tons with the Maryland Steel Company, which will also roll 12,000 tons for the Seaboard Air Line. A sale of 3500 tons has been made to the Guatemala Central Railway, and the rails will be rolled at Pittsburgh. The National Railway of Hayti, for which a construction company has been organized in New York, will require 26,000 tons of 48-lb. rails.

The closing down of the rail mill at Ensley, Ala., illustrates the intermittent character of railroad buying. This mill will be idle in May, but has rollings scheduled for June, when the by-product coke plant and the new water system will be completed, adding to the economies of operation at the Ensley Works.

The large amount of structural work pending in and about New York City will severely test fabricating prices, as well as those of plain material. For the Pennsylvania Railroad connecting bridge at Ward's and Randall's islands specifications have just been issued for 35,000 tons. The Interborough Rapid Transit Company is seeking to place the entire 80,000 tons

for its extensions with one company. The Continental Fire Insurance Building was awarded to Milliken Brothers and the 8000 tons of steel will be in large part Bethlehem shapes. Lettings of loft buildings in New York this week amounted to 5000 tons.

In sheets further shading of prices is reported, particularly in the South and Southwest, and may lead to a formal reduction.

Bars are lagging and agricultural buying ostensibly waits to be stimulated by a price concession. Reinforcing bars have been quite active.

The reduction in iron ore has had no effect on prices of foundry iron, but the market is halting. Sellers are looking to May for the beginning of another buying movement, that month having more than once brought such a turn. Deliveries have been held up in some districts, and in the East the machinists' strike is cutting down foundry operations.

Basic iron is weaker at \$13.60, at Valley furnace. Small sales are reported in eastern Pennsylvania at \$15, delivered.

Iron ore charters on the lakes have established rates on the basis of 60c. from the head of the lakes, or 10c. below that of 1910. Furnacemen show little interest in the ore market, and the movement in May will be unusually light.

Connellsville coke output is being cut down, but meantime coke on cars that must be moved has sold as low as \$1.40, as against \$1.55 for May and June shipment.

### New Steel Capacity in Germany and at Home

Attention has been called from time to time to the expanding capacity of German iron and steel works and the influence of the German Steel Works Union as a factor in this expansion. Two important new plants have been conspicuous in this connection, the works of the Gelsenkirchen Company at Esche in Luxemburg and the new Thyssen Works at Hagendingen in Lorraine. Quite as notable, however, have been the additions made to older works, in the balancing of blast furnace plants with steel works and rolling mills, or *vice versa*, and the entrance of established works upon the manufacture of new lines of product. All this new construction has an important bearing on the renewal of the syndicate agreement which expires at the end of June, 1912. It is no secret that the various companies have been getting in shape to make demands for a much larger share in the allotments under the new agreement, if one is made.

Another feature of this expansion is its relation to the prosperity the German iron and steel manufacturers have enjoyed in recent years. Reviews of the situation recently published in Germany call attention to the fact that the iron and steel works have contributed not a little to the trade in their own products by the new plants they have been erecting.

On the surface it would seem that the building of new iron and steel works in the United States and the expansion of old plants in the past few years are not due to any such cause as that operating in Germany. There is no syndicate in this country and there are no allotments of tonnage on the German syndicate plan. It is a question, however, whether the co-operative movement among the steel manufacturers of this country and the position of sponsor for the trade which the

United States Steel Corporation has had to assume, willingly or unwillingly, do not furnish some parallel to the German situation. It may be said that primarily the prosperity of the American iron trade in 1905, 1906 and 1907 and the profitable prices ruling through most of that period are responsible for the building of new works beyond the country's needs. At the same time it may be questioned whether as much capital would have gone into new plant but for the knowledge that back of the market was a powerful interest whose financial connections were such that it was bound to prevent demoralization in the prices of its products. Undoubtedly, too, there has entered into our steel plant expansion of recent years the level of prices maintained for semifinished steel. The policy of making a relatively small spread between the prices of steel billets and sheet bars and those of finished products rolled from them has no doubt added in no small amount to the open hearth steel capacity of the country.

The domestic situation plainly shows a parallel to that in Germany in the contribution the iron industry has made to its own prosperity by its own new construction. The same may be said of our railroads. Their unparalleled purchases of steel and equipment in the years 1905 to 1907, inclusive, involving hundreds of millions, contributed greatly to their earnings through the remarkable stimulus given to all industries affected by such buying. It is quite certain that the steel companies of this country will not be their own customers to any large extent through new plant construction in the next two or three years. It is not so certain, however, that the railroads, which always carry too far their abstention from the iron and steel and equipment markets, will not stimulate their own activities through large purchases for equipment long before the next era of steel works building.

### The New York Machinists' Strike

Although intimations had been given for some time that the International Association of Machinists intended to put into execution a strike in New York and vicinity for an eight-hour day on May 1, the feeling had been quite confident that as the time approached the proposed strike would be abandoned. This belief was engendered by the fact that a decided recession in business had occurred since the first announcement was made that such a strike was contemplated. It is, therefore, a matter of some surprise that it has actually taken place. At this writing quite a number of machine shops in New York and vicinity have either been closed or have had their working forces seriously cut down by the strike.

It is quite significant that although the International Association of Machinists desires to put in effect a general eight-hour day for its members, this strike is confined to the immediate vicinity of New York. It would seem that this locality had been selected as probably presenting a weak point at which an attack could be made on proprietors of machine shops. The eight-hour day prevails in many trades in the vicinity. The building trades are, of course, prominent in this respect, as the eight-hour day has prevailed in this branch of industry for a number of years. Quite a number of other trades have from time to time yielded to the demand for a shorter work day. The machinists, therefore, have the backing of a very considerable



number of workmen who are now employed only eight hours a day, and who, of course, sympathize deeply with the efforts of the former to secure a shorter day in their trade.

It may be presumed that employers' associations will use their utmost endeavors to prevent this strike from being successful. They have in their favor the general slackness in business, which has already thrown a number of workmen out of employment, from among whom it will be possible to fill the places of many of those who have struck. If the contest is to be confined to the vicinity of New York, the International Association of Machinists unquestionably has a stubborn fight on its hands, with the chances strongly in favor of defeat. The union leaders, of course, have begun to talk of sympathetic strikes for the purpose of making their cause stronger. This, however, may apply to other labor in the vicinity and not to any effort to impose a general strike.

Many employers of labor in New York and vicinity are now seriously handicapped by the short hours of employment and the high rates of wages they are compelled to pay. In consequence of this, much work which ordinarily would be done in the shops in the locality has been transferred to other sections of the country. The business interests of New York have suffered, and the workmen themselves in the branches affected have not had the steady employment which would have been enjoyed by them if labor conditions in New York were more nearly on an equality with those of outside localities. It is now attempted to extend this unsatisfactory condition to the machine shops. The effort deserves to be defeated and to be defeated decisively.

### The Long Life of American Machine Tools

Used machinery is generally considered hard to dispose of at advantageous prices, but of late in some parts of the country the demand for certain classes of second-hand machine tools has been in excess of the supply. This is a fair indication that the machine tool industry on the whole is not a sufferer through overproduction. However, there is another reason for the scarcity of used machine tools and that is the fact that American machinery of this class seems to be able to endure a long period of active work and is adaptable for use in shops where the highest state of efficiency is not an absolute necessity long after it has been discarded by some manufacturers. In certain lines of manufacture, such, for instance, as the automobile industry, rapid production is of paramount necessity, and consequently machine tools are discarded for more improved machines before they have outlived their usefulness. In machine shops where the tools are used for making repair parts such discarded machines are found satisfactory. The care used in the construction of American machinery of this class is evidenced by the readiness with which it can be sold.

Recently a good consignment of second-hand milling machines and shapers was bought for export to South America by a keen purchaser who could have obtained new machinery for early delivery if he had wished. The buyer stated that for his wants the used machines were almost as adaptable as new equipment. Machine tool salesmen tell interesting experiences of their encounters with shop owners who have been

using the machines they sell for unusually long periods. It can be seen from this that the scarcity of second-hand American tools is not so much the result of a leaning toward economy on the part of buyers as because of the lasting usefulness of the equipment.

### A Concentrated Advisory Board

Commissions and legislative committees which have had to do with framing bills concerning workmen's compensation complain of insufficient co-operation on the part of the manufacturing industry. They have met with individual manufacturers and occasionally a representative of some organization of manufacturers, but the assistance that they have thus received has been comparatively trifling. They urge a concerted movement on the part of the great associations. This suggestion has been made in response to the plea that a commission be established made up of one representative of each of the associations of industrial employers. The National Metal Trades Association, the National Machine Tool Builders' Association, the National Manufacturers' Association, the foundrymen's associations, the great representative bodies of textile trades and other similar organizations could establish a commission which would be an important adviser of those to whom the question of employers' liability legislation is intrusted. The authorized delegate from each association, having the power to represent his fellows, in combination with others similarly selected, would concentrate the interests of employers, just as the interests of labor are concentrated in its organized bodies. Probably it would not be desirable to mingle employers and employees in the single commission, nor would it be wise to give representation to those organizations in which the theorist is the controlling force. The commission would be, strictly speaking, an advisory one. Each member would be picked by his association for his fitness and his interest in the subject. Such a commission would undoubtedly be of great assistance in molding legislation on this important subject on practical lines. The same commission could doubtless act as intelligently and effectively in connection with other forms of legislation which affect the manufacturing industry.

### The American Workingman

Reference has already been made in these columns to the report of the commission appointed by the British Board of Trade to investigate the condition of the American workingman. The findings of the commission appointed by that department of the British Government have naturally excited much interest on the other side of the Atlantic, as comparison made with the British workingman's condition was so favorable to the United States. The *London Economist* devotes considerable space to an analysis of the report. It leads up to the higher prices paid for sundry articles in this country and concludes:

Despite these high prices, there is no doubt that from the monetary point of view the position of the skilled workman in the United States is better than that of a similar artisan in Great Britain. But the comparison is not between two countries on a similar economic plane. It is between our own industrially fully developed island and the enormous extent of country forming the United States, filled with natural resources, for the most part to a great extent still undeveloped, and dependent for progress upon a

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rapid increase in population. In comparison with countries at the same stage of industrial development as ourselves, social conditions in Great Britain have been proved in every way more desirable. The previous reports for Germany, France and Belgium have shown that on the Continent wages are lower, hours are longer, while rent and cost of living are higher. But when we come to the New World it would indeed have been surprising if the comparison had been in our favor. Those who have followed recent American history cannot doubt that, but for the high tariff, we should have appeared to still greater disadvantage. In a new country like America we must expect to find these conditions to some slight extent reversed. Indeed, it is only the retention by the United States of a high customs tariff that has prevented the distinction becoming even more marked.

Of course, it was to be expected that the American tariff would be brought into the discussion of the subject by a British journal. The tariff is evidently held responsible for our prevailing higher level of prices than those ruling in Great Britain. The tariff, however, is from our viewpoint less responsible than labor conditions. Opportunities for remunerative employment are much more favorable in a country of expanding trade like the United States.

## New Publications

**Mechanical Engineers' Pocket-Book.**—By William Kent. Eighth edition. Size, 4 x 6 3/4 in.; pages, 1461; 218 illustrations and diagrams and numerous tables. Bound in leather. Price \$5, net. Published by John Wiley & Sons, New York City.

In bringing out the eighth edition of this reference book of rules, tables, data and formulae for the use of engineers, mechanics and students, many chapters have been entirely rewritten to take account of the advances made in engineering practice since the seventh edition was published in 1904. In spite of all efforts to save space by the condensation and the elision of much of the old matter, and resetting in a shorter form many of the tables and formulae, the size of the book has been increased over 300 pages, although this change has not made the volume too large to be a convenient desk reference book. In general, the arrangement of the book does not differ from the preceding editions, and a table of contents and an alphabetical index covering 44 pages render the finding of any subject an easy matter. One of the special features of the index is the use of catch letters at the top of each page to indicate the first and the last subjects on it.

## Lead and Spelter Production in 1910

The production of refined lead in the United States in 1910, as shown by an advance statement issued by the United States Geological Survey, was 470,380 net tons, an increase over the figures for 1909 of 22,268 tons.

From the same source comes the information that the production of spelter in this country in 1910 was 269,184 net tons, or about 5 per cent. greater than that for 1909, also that it was greater than that of any other country, Germany coming next with 251,059 tons. The production of the United States was between one-fourth and one-third of the total world's production for the year.

The Wolverine Supply & Mfg. Company, manufacturer of dies and stamped metal specialties, has removed its plant and offices from the Imperial Power Building, Pittsburgh, to Irwin avenue, N. S., Pittsburgh, where it has secured a long lease on a two-story brick building that contains about double the former floor space.

The plants of the Damascus Nickel Steel Company and of the Damascus Tool Steel Company, East Carnegie, near Pittsburgh, now in the hands of S. M. Wetmore, receiver, will be offered for sale at public auction, June 22, by the Trust Company of North America, trustee.

## Steel Manufacturers Consider Welfare Work

The meeting of the directors of the American Iron and Steel Institute, held at its offices at 30 Church street, New York, Wednesday afternoon, April 26, was devoted almost entirely to the consideration of labor and welfare questions, which, it is stated, will be made an increasingly important part of the work of the organization. The committee appointed last year to consider measures for the establishment of a six-day week, so far as possible, for all iron and steel workers, presented a tentative report through its chairman, William B. Schiller. This report will be sent to all manufacturers who are members of the institute, and they will be asked to put into effect such of its recommendations for abolishing the seven-day working week as can be made applicable to their operations. It was decided to create a standing committee of the institute on welfare work. It will consist of nine members. President E. H. Gary will be chairman and five of the members will be those now constituting the special committee—namely, William B. Schiller, E. A. S. Clarke, F. W. Wood, James A. Campbell and George G. Crawford. The three remaining members are yet to be selected. There was also some discussion at the meeting of plans for the American representation at the international conference of steel manufacturers, to be held at Brussels, Belgium, in July.

In a published statement Judge Gary said that the meeting had nothing to do with prices of products. "At present," he said, "we are all strongly bent upon doing something thorough and lasting for the protection of the lives and health of the men who work in the steel mills. It is all a very difficult proposition and one that has received a great deal of earnest consideration from steel manufacturers in this country. The problem of keeping down the daily hours of labor to a reasonable basis and the problem of letting each man at work in the mills have the equivalent of a Sunday off each week are very difficult in an industry many of whose processes of manufacture have to be carried straight through from start to finish by a single set of men. We are naturally much bound down by the compulsions found inherently in the very nature of the physical processes used in the manufacture of steel products. However, thorough study of the problem will do much to relieve unequal strain upon the men at work."

**American Iron and Steel Institute.**—The annual meeting of the American Iron and Steel Institute was held at its offices, 30 Church street, New York, Monday, May 1. The following were elected directors for the three-year term expiring in 1914: J. A. Farrell, E. C. Felton, Elbert H. Gary, Charles M. Schwab and Powell Stackhouse. Mr. Farrell was elected in place of W. E. Corey. The others were re-elected. Officers will be elected at the regular meeting of the directors to be held Wednesday, May 24.

A notice has been posted at the Carnegie Steel Company's works, at South Sharon, Pa., that hereafter no employee will be allowed to work more than six days a week. In case a man is compelled to work on Sunday, he is to get a day off in that week for rest. The order not only applies to blast furnace and steel works labor, but to all other departments in which it is practicable to put it into effect.

The New York offices of the Detroit Steel Products Company were removed May 1 from 2 Rector street to 225 Fifth avenue, the company needing better facilities to meet the growing demand for Detroit Fenestra windows. Raymond H. Kinnear is the manager in charge of this office.

It is reported that the Baldwin Locomotive Works has reduced its forces at its plants in Philadelphia and Eddystone, Pa., from 16,000 to 12,000 men in the past few weeks, and many of the men now employed are on short time.



### The New York Barge Canals

The new system of barge canals which will take the place of the Erie Canal, and open up a wider territory than that waterway ever reached, says the *Wall Street Journal*, is divided into four principal sections, the Champlain, the Erie, the Oswego and the Cayuga and Seneca. The Champlain Canal is a canalization of the Hudson River from Albany to Fort Edward, thence in a land line and by way of the canalized Wood Creek to Whitehall at the southern end of Lake Champlain. The Erie, Oswego and Cayuga and Seneca canals have a line that is common to all three as far as Three River Point. This is the canalized Mohawk River to Rome, thence by land line to Oneida Lake, thence by way of the lake and Oneida River to Three River Point, from which place the canalized Oswego River runs north to Lake Ontario. The Erie Canal continues west from Three River Point by way of the Seneca River. The Cayuga and Seneca Canal enters the Erie from the southward at a point near the village of Clyde. The western division of the Erie continues through Rochester, Lockport and smaller communities until it enters the Niagara River at Tonawanda.

The old Erie Canal was completed in 1825, and, including its side connections, was 363 miles long. Originally, the water surface width was 40 ft.; bottom width, 28 ft.; depth, 4 ft. The locks were 90 ft. long and 15 ft. wide. The boats employed at that time were bateaux of an average carrying capacity of 70 tons. The canal was subsequently enlarged, and in the following table are given the nominal dimensions which the improvements called for, as well as the figures showing dimensions of the new systems of barge canals:

	New barge canals.	Old Erie Canal.
	Feet.	Feet.
Depth .....	12	6 to 7
Surface width.....	123	70
Bottom width.....	75	50 to 60
Locks:		
Width .....	45	18
Length .....	325	100
Depth on sill.....	12	7
Capacity of barge (tons).....	1,000 to 2,000	230

Lock lifts on the new canal vary from 6 to 41 ft., which is the lift at Little Falls, the highest direct lift in the world.

Canal tolls were abolished in 1883, after having been in force since the completion of the canal in 1825. At that date net revenues from the canal had exceeded by \$14,000,000 the total original cost, plus cost of improvements, maintenance and repairs. At present the canal and lake rate on 100 lb. of merchandise from New York to Chicago is 42 cents. It is impossible to foretell what rate will be enforced over the new system, but it is certain that with the increase in size of vessel, rate of speed and improved facilities there will be a substantial reduction.

It is expected that the new system will be completed within three years. At present, only part of the Champlain Canal and a few places on the Oswego are open to navigation. In constructing the barge canals, it has been found impracticable to use any of the old works on the Champlain section. On the Erie and Oswego only about 15 per cent. of the old course is followed. The main portion of the old canal which will be utilized in the new system lies west of the town of Newark, which is 200 miles west of Albany.

During the current calendar year it is estimated that \$20,000,000 will be paid to contractors for work completed on the canals. The work is being pushed forward consistently. Contractors who have failed in their work have been replaced by others, or by their original bondsmen. New equipment has been provided on all important contract works and there is every reason to believe that the work, as a whole, will be completed at the time expected, three years from now. The Champlain Canal will be ready for use throughout its entire length within two years. Traffic on the canal averages about 4,000,000 tons a year, and the estimate for the current year is placed at the same amount.

Six years ago, on April 29, 1905, work on the new barge canal system began. The work was authorized under act of Legislature of 1903, by which \$101,000,000 was appropriated. This included construction, land damage and all other expenditures. Estimate for contract expenditure was \$75,112,547. This is exclusive of the Cayuga & Seneca Canal, the appropriation for whose construction was made by referendum in 1909. It is a noteworthy fact that the contracts actually let called for an expenditure of \$72,607,700, approximately \$2,500,000 below the estimate. Total expenditure on extra work to March 1, 1911, has amounted to only \$218,245.

### Manufactures in Utah

A preliminary statement of the general results of the census of manufactures for the State of Utah shows a large increase at the census of 1909 as compared with that for 1904. It is important as indicating how Western business is growing.

There were 749 manufacturing establishments in 1909 and 606 in 1904, an increase of 143, or 24 per cent. The capital invested as reported in 1909 was \$52,627,000, a gain of \$26,623,000 or 102 per cent. over \$26,004,000 in 1904. The average capital per establishment for 1909 was approximately \$70,000, and in 1904, \$43,000.

The cost of materials used in 1909 was \$41,292,000, as against \$24,940,000 in 1904, an increase of \$16,352,000, or 66 per cent. The average cost of materials per establishment in 1909 was approximately \$55,000, and in 1904, \$41,000.

The value of products in 1909 was \$61,989,000, and \$38,926,000 in 1904, an increase of \$23,063,000, or 59 per cent. The average per establishment was approximately \$83,000 in 1909 and \$64,000 in 1904. In 1909 the value added by manufacture was \$20,697,000, and in 1904 \$13,986,000, an increase of \$6,711,000, or 48 per cent. The value added by manufacture in 1909 formed 33 per cent of the total value of products, and in 1904 36 per cent.

Salaries and wages in 1909 amounted to \$10,376,000, and in 1904, \$6,196,000, an increase of \$4,180,000, or 67 per cent. In 1909 the number of salaried officials and clerks was 1660, and in 1904, 979; an increase of 681, or 70 per cent. The average number of wage earners in 1909 was 11,785, and in 1904, 8052, an increase of 3733, or 46 per cent.

The International Hygiene Exposition, which is to open at Dresden, Germany, May 6, is without official representation by the United States, it being the only important country in the world to ignore the event. Congress failed to make an appropriation, although requested to do so by the State Department. The exposition will be open until November.

The Princess Royal, the largest cruiser battleship ever built for the British navy, was launched April 29 at Barrow-in-Furness, England. She has a displacement of 26,360 tons and turbine engines affording 70,000 hp. Her contract calls for a speed of 28 knots an hour. She will carry eight 13.5 in. guns, besides smaller weapons.

A meeting of the committee having in charge the merger of the Southern Iron & Steel Company and the Alabama Consolidated Coal & Iron Company was held this week, and it is expected that the details of the plan will be announced in the near future.

The Senate Finance Committee at Washington began this week to hold hearings on the Canadian reciprocity bill. All who desire to express their views will be heard, but the taking of testimony will be concluded May 13. The bill will probably be reported to the Senate without recommendation.

The Jones & Laughlin Steel Company's three Aliquippa blast furnaces have been inactive for some weeks, but it is expected they will be started up next month.

## Pig Iron Production

### A Substantial Falling Off in April

#### Active Capacity May 1 Well Below the Rate at the Beginning of March

Our blast furnace statistics appear earlier than usual through the promptness of the furnace companies in reporting. In the 30 days of April the coke and anthracite furnaces produced 2,065,086 tons, or 68,836 tons a day, against 2,171,111 tons in March, or 70,036 tons a day. Present conditions are better indicated by the fact that the month brought a net decrease of 19 in the number of furnaces active, this being 212 on May 1, against 231 on April 1, while the active capacity fell from 70,752 tons a day on April 1 to 64,432 tons on May 1. The industry thus lost in April considerably more than the gain of March, the active daily capacity on March 1 having been 66,562 tons. Production is now at the rate of 23,850,000 tons a year, estimating charcoal iron, whereas on April 1 the yearly rate was 25,750,000 tons. The loss is thus nearly 7½ per cent., and it is known that other furnaces will go out in the next week or two.

#### Daily Rate of Production

The daily rate of production of coke and anthracite pig iron by months, beginning with April, 1910, is as follows:

	Daily Rate of Pig Iron Production by Months—Gross Tons.		
	Steel Works.	Merchant.	Total.
April, 1910.....	55,663	27,129	82,792
May.....	52,235	24,867	77,102
June.....	51,637	23,879	75,516
July.....	47,183	22,122	69,305
August.....	46,534	21,429	67,963
September.....	47,007	21,536	68,542
October.....	45,794	21,726	67,520
November.....	41,427	22,232	63,659
December.....	35,909	21,440	57,349
January, 1911.....	36,401	20,351	56,752
February.....	42,349	21,741	64,090
March.....	48,970	21,066	70,036
April.....	47,805	21,031	68,836

#### April Output by Districts

The table below gives the production of all coke and anthracite furnaces in April and the four months preceding:

	Monthly Pig Iron Production.—Gross Tons.				
	December. (31 days)	January. (31 days)	February. (28 days)	March. (31 days)	April. (30 days)
New York.....	142,674	136,519	131,238	157,624	139,674
New Jersey....	15,437	12,627	6,006	5,869	5,150
Lehigh Valley..	68,531	68,324	56,367	69,263	78,182
Schuylkill Val..	51,466	60,592	57,321	67,634	55,305
Lower Susquehanna and Lebanon Val..	51,888	43,942	42,729	46,980	44,537
Pittsburgh dis..	397,379	409,698	424,517	531,521	488,447
Shenango Val..	82,706	82,922	86,908	109,799	109,239
West. Penn....	81,957	94,118	96,616	120,464	100,593
Md., Va. and Kentucky....	59,945	56,424	57,759	61,628	60,978
Wheeling dis..	74,225	77,715	95,571	135,775	119,489
Mahoning Val..	162,349	174,318	201,624	203,006	189,822
Central and North, Ohio..	112,662	127,579	144,806	170,914	161,742
Hocking Valley, Hanging Rock and S.W. Ohio	29,959	33,253	32,396	35,173	27,084
Mich., Minn., Mo., Wis., Col., Wash.	68,313	60,941	61,406	69,741	76,379
Chicago dis....	197,340	165,826	155,498	213,638	236,550
Alabama.....	154,025	128,188	118,594	143,751	149,737
Tenn., Georgia and Texas....	26,961	26,340	25,153	28,331	22,178

Total.....1,777,817 1,759,326 1,794,509 2,171,111 2,065,086

Among furnaces blown out in April were Buffalo Union C at Buffalo, one Warwick in the Schuylkill Valley, one Paxton in the Lower Susquehanna Valley, one Clairton, one Duquesne, two Edgar Thomson and one Isabella in the Pittsburgh district, six Cambria and Adrian (May 1) in western Pennsylvania, one Mingo in the Wheeling district, three Ohio in the Mahoning Valley, Dover in Ohio, one Federal at Chicago, and Tuscaloosa in Alabama. Few furnaces were blown in, the list including one Bird Coleman in the Lebanon Valley, Tod and Mary in the Mahoning Valley, and one Gary in the Chicago district.

#### Capacity in Blast May 1 and April 1

The following table shows the daily capacity of furnaces in blast May 1 and April 1:

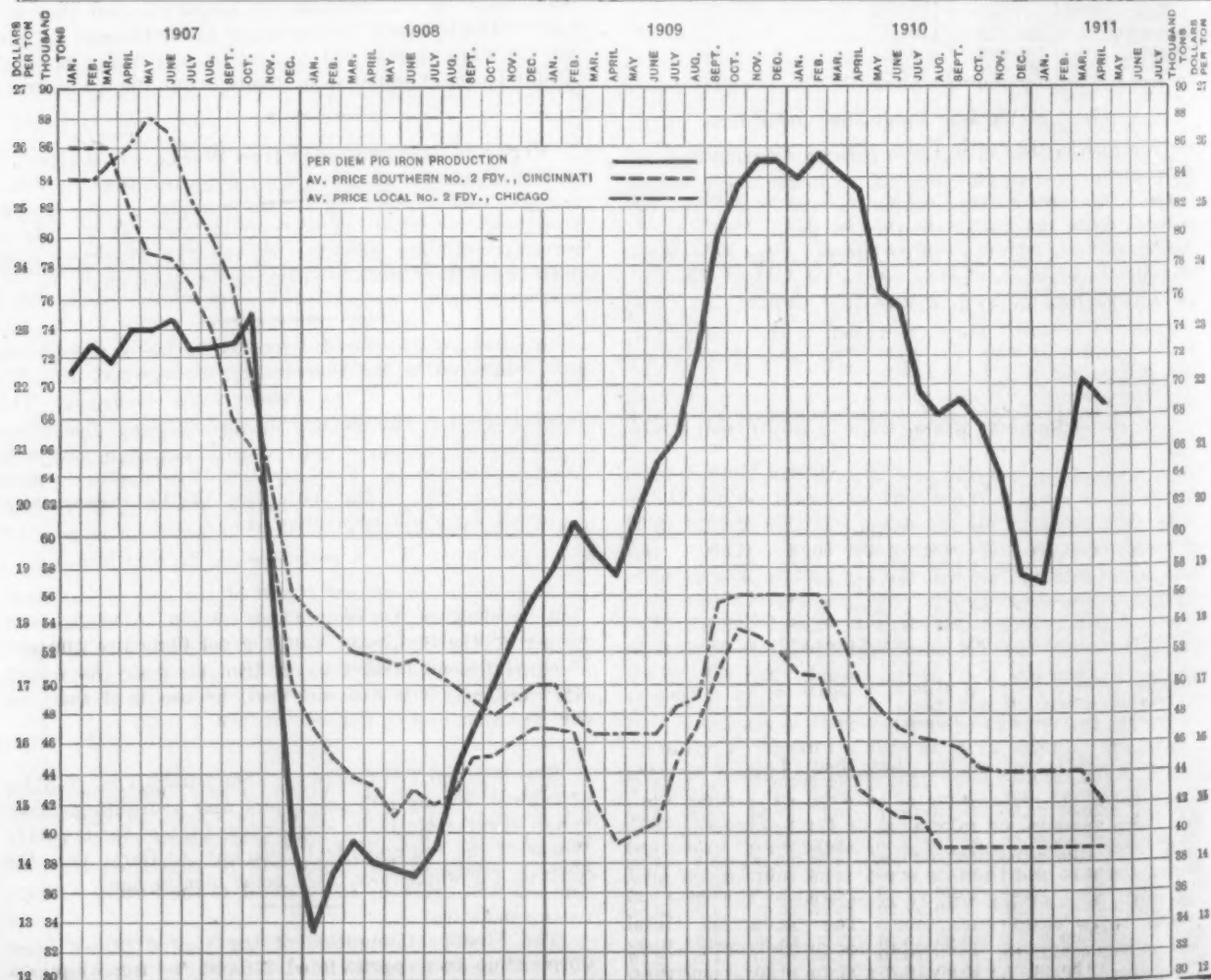


Diagram of Daily Average Production by Months of Coke and Anthracite Pig Iron in the United States from January 1, 1907, to May 1, 1911; Also of Monthly Average Prices of Southern No. 2 Foundry Iron at Cincinnati and Local No. 2 Foundry Iron at Chicago District Furnace.



Coke and Anthracite Furnaces in Blast.

Location of furnaces.	Total number of stacks.	May 1.		April 1.	
		Number in blast.	Capacity per day.	Number in blast.	Capacity per day.
New York:					
Buffalo .....	17	12	4,327	13	4,375
Other New York...	7	1	164	2	314
New Jersey.....	7	1	172	1	190
Spiegel .....	2				
Pennsylvania:					
Lehigh Valley.....	24	13	2,524	13	2,625
Spiegel .....	3	1	82	1	88
Schuylkill Valley...	16	7	1,810	8	2,182
Low. Susquehanna..	7	3	583	4	726
Lebanon Valley.....	10	6	862	5	789
Pittsburgh district..	56	34	14,467	39	16,725
Spiegel .....	3	2	273	2	295
Shenango Valley....	20	11	3,641	11	3,638
West. Penn.....	27	6	1,755	13	4,095
Maryland .....	4	3	749	3	806
Wheeling district....	14	11	3,983	12	4,380
Ohio:					
Mahoning Valley....	23	16	6,085	17	6,590
Central and North..	22	13	5,082	14	5,484
Hocking Val., Hang-					
lag Rock and S. W.					
Ohio .....	15	7	902	7	898
Illinois and Indiana..	34	19	7,585	19	7,365
Mich., Wis. and Minn..	10	6	1,455	6	1,380
Colo., Mo. and Wash..	7	4	1,090	4	1,042
The South:					
Virginia .....	23	9	972	9	965
Kentucky .....	5	2	311	2	285
Alabama .....	46	18	4,823	19	4,710
Tenn. and Georgia..	20	7	735	7	805
Total.....	416	212	64,432	231	70,752

Production of Steel Companies

Returns from all plants of the United States Steel Corporation and the various independent steel companies show the following totals of product month by month. Only steel making iron is included in these figures, together with ferromanganese, spiegeleisen and ferrosilicon. These last, while stated separately, are also included in the columns of "total production":

Production of Steel Companies.—Gross Tons.

	Pig.—Total production.			Spiegeleisen and ferromanganese.	
	1909.	1910.	1911.	1910.	1911.
January .....	1,117,823	1,773,201	1,128,448	19,538	8,360
February .....	1,073,363	1,620,539	1,185,782	21,396	12,821
March .....	1,140,553	1,739,212	1,518,063	25,591	11,784
April .....	1,093,092	1,660,898	1,434,142	22,304	10,657
May .....	1,256,448	1,619,283	.....	26,529	.....
June .....	1,365,527	1,549,112	.....	27,680	.....
July .....	1,508,762	1,462,689	.....	22,924	.....
August .....	1,591,991	1,442,572	.....	25,756	.....
September .....	1,660,839	1,410,221	.....	15,151	.....
October .....	1,769,094	1,419,624	.....	8,500	.....
November .....	1,689,994	1,242,804	.....	9,032	.....
December .....	1,768,799	1,113,174	.....	12,178	.....

Chart of Pig Iron Production and Prices

The fluctuations in pig iron production from January, 1907, to the present time are shown in the accompanying chart. The figures represented by the heavy line are those of daily average production, by months, of coke and anthracite iron. The two other curves on the chart represent monthly average prices of Southern No. 2 foundry pig iron at Cincinnati and of local No. 2 foundry iron delivered at Chicago. They are based on the weekly market quotations of *The Iron Age*. The two sets of figures are as follows:

Daily Average Production of Coke and Anthracite Pig Iron in the United States by Months Since January 1, 1907.—Gross Tons.

	1907.	1908.	1909.	1910.	1911.
January .....	71,140	83,718	57,975	84,148	56,752
February .....	73,038	87,163	60,976	85,616	64,090
March .....	71,821	39,619	59,232	84,459	70,036
April .....	73,885	38,289	57,962	82,792	68,836
May .....	74,048	37,603	60,753	77,102	.....
June .....	74,486	36,444	64,656	75,516	.....
July .....	72,763	39,287	67,793	69,305	.....
August .....	72,594	43,851	72,546	67,963	.....
September .....	72,783	47,300	79,507	68,476	.....
October .....	75,386	50,554	83,856	67,520	.....
November .....	60,937	52,595	84,917	63,659	.....
December .....	39,815	56,158	85,022	57,349	.....

Monthly Average Prices in Dollars of Southern No. 2 Foundry Iron at Cincinnati and Local No. 2 Foundry at Chicago District Furnace Since January, 1907.

	1907.		1908.		1909.		1910.	
	Sou. No. 2.	Loc. No. 2.	Sou. No. 2.	Loc. No. 2.	Sou. No. 2.	Loc. No. 2.	Sou. No. 2.	Loc. No. 2.
Jan. ....	26.00	25.50	16.15	18.10	16.25	17.00	17.25	18.50
Feb. ....	26.00	25.50	15.75	17.81	16.13	16.40	17.06	18.50
March ....	26.00	25.75	15.50	17.50	15.05	16.15	16.30	17.80
April ....	25.06	26.00	15.20	17.38	14.25	16.15	15.37	17.00
May .....	24.25	26.50	14.75	17.28	14.50	16.15	15.00	16.56
June .....	24.10	26.25	15.25	17.38	14.70	16.15	14.85	16.25
July .....	23.85	25.20	15.00	17.20	15.75	16.65	14.75	16.06
Aug. ....	23.00	24.50	15.25	17.00	16.38	16.78	14.31	16.00
Sept. ....	21.50	23.75	15.65	16.70	17.35	18.35	14.25	15.90
Oct. ....	20.95	22.10	15.75	16.50	17.88	18.50	14.25	15.56
Nov. ....	19.50	20.31	16.00	16.75	17.75	18.50	14.25	15.50
Dec. ....	17.00	18.55	16.25	17.00	17.45	18.50	14.25	15.50
Jan., 1911.	14.25	15.00;	Feb., 14.25	15.00;	March, 14.25	15.00;		
April, 14.25	15.00.							

The Record of Production

Production of Coke and Anthracite Pig Iron in the United States by Months Since January 1, 1907.—Gross Tons.

	1907.	1908.	1909.	1910.
January .....	2,205,607	1,045,250	1,797,560	2,608,605
February .....	2,045,068	1,077,740	1,707,340	2,397,254
March .....	2,226,457	1,228,204	1,832,194	2,617,949
April .....	2,216,558	1,149,602	1,738,877	2,483,763
May .....	2,295,505	1,165,688	1,883,330	2,390,180
June .....	2,234,575	1,092,131	1,930,866	2,265,478
July .....	2,255,600	1,218,120	2,103,431	2,148,442
August .....	2,250,410	1,359,831	2,248,930	2,106,847
September .....	2,183,487	1,418,998	2,385,206	2,056,275
October .....	2,336,972	1,567,198	2,599,541	2,093,121
November .....	1,828,125	1,577,854	2,547,508	1,909,780
December .....	1,234,279	1,740,912	2,635,680	1,777,817
January, 1911.	1,759,326;	February, 1911.	1,794,509;	March, 1911, 2,171,111;
April, 1911,	2,065,086.			

Jones & Laughlin Improvements

The No. 3 Eliza furnace of the Jones & Laughlin Steel Company at Pittsburgh was blown out February 11 last, the old furnace was torn down, the salamander was blown out and a complete new stack has been erected in the record-breaking time of 73 days. The work was done by the company itself, under the direct supervision of Eugene L. Messler, general superintendent of the Eliza furnaces. Stack No. 1 of the Eliza group was completely rebuilt last year in 95 days.

The four Talbot open hearth furnaces of the company at Alliquippa are ready for operation, but as yet no date has been fixed for starting them. Each of these furnaces will have a daily output of about 225 tons of steel. All of the four blast furnaces at Alliquippa are idle, and have been for some time on account of the depression in the steel market. It is intended that two of these blast furnaces will serve the four Talbot open hearth furnaces with pig iron, while the output from the other two stacks, about 900 tons of Bessemer iron per day, will be shipped to the company's South Side mills.

Work is progressing rapidly on the 12 hot tin mills being built by the company at Alliquippa, and they are expected to be ready for operating about October 1. The new Morgan double rod mill, also now being built at Alliquippa, is expected to be ready about the same time.

**Reported Sale of Risdon Iron Works.**—It is reported at San Francisco that the United States Steel Corporation has been negotiating for the purchase of the Risdon Iron Works, with its large tract of land and ¼ mile of water front. The president of the San Francisco company has denied that the purchase has been made.

An important labor disturbance is the strike of the men employed in the Conemaugh, Youngwood, Pitcairn and Derry shops of the Pennsylvania Railroad. The men claim that the officials of the company discharged a number of old employees for becoming connected with labor organizations. Thus far the Altoona shops, which are the largest on the main line of the Pennsylvania Railroad, have not been affected.

Regarding the current report of the sale of the Baldwin Locomotive Works to Drexel & Co., Alba B. Johnson, vice-president, says that the company has officially taken the stand neither to confirm nor deny the report. Both parties concerned absolutely refuse to discuss the matter.

The William Tod Company, Youngstown, Ohio, builder of engines, rolling mill machinery and hydraulic presses, is now turning out in its shops runout tables for the Gary Works of the Indiana Steel Company, at Gary, Ind., the contract for which was taken some months ago.

The Finance Committee of the United States Steel Corporation has appropriated \$75,000 for improvements at the Rankin, Pa., plant of the American Steel & Wire Company.

# The Iron and Metal Markets

## A Comparison of Prices

Advances Over the Previous Week in Heavy Type,  
Declines in Italics.

At date, one week, one month and one year previous.

May 3, Apr. 26, Apr. 5, May 4,  
1911. 1911. 1911. 1910.

<b>PIG IRON, Per Gross Ton:</b>				
Foundry No. 2, standard, Philadelphia	\$15.50	\$15.50	\$15.50	\$17.00
Foundry No. 2, Valley furnace	13.75	13.75	13.75	15.50
Foundry No. 2, Southern, Cincinnati	14.25	14.25	14.25	15.25
Foundry No. 2, Birmingham, Ala.	11.00	11.00	11.00	12.00
Foundry No. 2, local, Chicago*	15.00	15.00	15.50	17.25
Basic, delivered, eastern Pa.	15.00	15.00	15.25	17.00
Basic, Valley furnace	13.60	13.75	13.75	15.50
Bessemer, Pittsburgh	15.90	15.90	15.90	17.90
Gray forge, Pittsburgh	14.40	14.40	14.40	15.90
Lake Superior charcoal, Chicago	17.50	17.50	17.50	19.00

### COKE, CONNELLSVILLE,

Per Net Ton, at oven:

Furnace coke, prompt shipment	1.55	1.55	1.60	1.75
Furnace coke, future delivery	1.75	1.75	1.75	2.00
Foundry coke, prompt shipment	1.90	2.00	2.00	2.25
Foundry coke, future delivery	2.15	2.20	2.25	2.50

### BILLETS, &c., Per Gross Ton:

Bessemer billets, Pittsburgh	23.00	23.00	23.00	26.50
Forging billets, Pittsburgh	28.00	28.00	28.00	32.00
Open hearth billets, Philadelphia	25.40	25.40	25.40	30.00
Wire rods, Pittsburgh	29.00	29.00	29.00	32.00

### OLD MATERIAL, Per Gross Ton:

Iron rails, Chicago	14.25	14.25	14.50	18.00
Iron rails, Philadelphia	16.75	17.00	18.00	20.00
Car wheels, Chicago	13.25	13.25	13.25	16.00
Car wheels, Philadelphia	13.00	13.00	13.25	15.50
Heavy steel scrap, Pittsburgh	12.50	12.50	13.75	15.50
Heavy steel scrap, Chicago	11.50	11.50	11.50	13.75
Heavy steel scrap, Philadelphia	13.00	13.00	13.50	15.00

### FINISHED IRON AND STEEL,

Per Pound:

Bessemer steel rails, heavy, at mill	1.25	1.25	1.25	1.25
Refined iron bars, Philadelphia	1.32½	1.32½	1.37½	1.50
Common iron bars, Chicago	1.25	1.25	1.25	1.50
Common iron bars, Pittsburgh	1.32½	1.35	1.35	1.55
Steel bars, tidewater, New York	1.56	1.56	1.56	1.61
Steel bars, Pittsburgh	1.40	1.40	1.40	1.45
Tank plates, tidewater, New York	1.56	1.56	1.56	1.71
Tank plates, Pittsburgh	1.40	1.40	1.40	1.55
Beams, tidewater, New York	1.56	1.56	1.56	1.66
Beams, Pittsburgh	1.40	1.40	1.40	1.50
Angles, tidewater, New York	1.56	1.56	1.56	1.66
Angles, Pittsburgh	1.40	1.40	1.40	1.50
Skelp, grooved steel, Pittsburgh	1.30	1.30	1.30	1.50
Skelp, sheared steel, Pittsburgh	1.35	1.35	1.35	1.60

### SHEETS, NAILS AND WIRE,

Per Pound:

Sheets, black, No. 28, Pittsburgh	2.20	2.20	2.20	2.40
Wire nails, Pittsburgh†	1.80	1.80	1.80	1.85
Cut nails, Pittsburgh	1.60	1.65	1.70	1.85
Barb wire, galv., Pittsburgh†	2.10	2.10	2.10	2.15

### METALS, Per Pound:

Lake copper, New York	12.30	12.37½	12.50	13.00
Electrolytic copper, New York	12.10	12.12½	12.25	12.40
Spelter, New York	5.50	5.50	5.55	5.15
Spelter, St. Louis	5.30	5.30	5.35	5.00
Lead, New York	4.42½	4.42½	4.45	4.40
Lead, St. Louis	4.27½	4.27½	4.30	4.25
Tin, New York	42.00	42.50	41.75	32.70
Antimony, Hallett, New York	9.00	9.00	9.12½	8.12½
Tin plate, 100-lb. box, New York	\$3.94	\$3.94	\$3.94	\$3.84

\* This price is at furnace and not delivered in Chicago. The average switching charge in the Chicago district is 50c. per ton.  
† These prices are for largest lots to jobbers.

## Prices of Finished Iron and Steel f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Paul, 32c.; St. Louis, 22½c.; New Orleans, 30c.; Birmingham, Ala., 45c. Rates to the Pacific Coast are 80c. on plates, structural shapes and sheets, No. 11 and heavier; 85c. on sheets, Nos. 12 to 16; 95c. on sheets, No. 16 and lighter; 65c. on wrought boiler tubes.

**Structural Material.**—I-beams and channels, 3 to 15 in., inclusive, 1.40c. to 1.45c., net; I-beams over 15 in., 1.50c. to 1.55c., net; H-beams over 8 in., 1.55c. to 1.60c.; angles, 3 to 6 in., inclusive, ¼ in. and up, 1.40c. to 1.45c., net; angles over 6 in., 1.50c. to 1.55c., net; angles, 3 in., on one or both legs, less than ¼ in. thick, 1.45c., plus full extras

as per steel bar card effective September 1, 1909; tees, 3 in. and up, 1.45c., net; zees, 3 in. and up, 1.40c. to 1.45c., net; angles, channels and tees, under 3 in., 1.45c., base, plus full extras as per steel bar card of September 1, 1909; deck beams and bulb angles, 1.70c. to 1.75c., net; hand rail tees, 2.50c.; checkered and corrugated plates, 2.50c., net.

**Plates.**—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.40c. to 1.45c., base. Following are stipulations prescribed by manufacturers, with extras to be added to base price (per pound) of plates:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, or equivalent, ¼-in. thick and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base. Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per square foot are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¼-in. thick on edge, or not less than 11 lb. per square foot, to take base price. Plates over 72 in. wide ordered less than 11 lb. per square foot down to the weight of 3-16-in. take the price of 3-16-in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Gauges under ¼-in. to and including 3-16-in. on thinnest edge	\$0.10
Gauges under 3-16-in. to and including No. 8	.15
Gauges under No. 8 to and including No. 9	.25
Gauges under No. 9 to and including No. 10	.30
Gauges under No. 10 to and including No. 12	.40
Sketches (including all straight taper plates), 3 ft. and over in length	.10
Complete circles, 3 ft. in diameter and over	.20
Boiler and flange steel	.10
"A. B. M. A." and ordinary firebox steel	.20
Still bottom steel	.30
Marine steel	.40
Locomotive firebox steel	.50
Widths over 100 in. up to 110 in., inclusive	.05
Widths over 110 in. up to 115 in., inclusive	.10
Widths over 115 in. up to 120 in., inclusive	.15
Widths over 120 in. up to 125 in., inclusive	.25
Widths over 125 in. up to 130 in., inclusive	.50
Widths over 130 in.	1.00
Cutting to lengths or diameters under 3 ft. to 2 ft., inclusive	.25
Cutting to lengths or diameters under 2 ft. to 1 ft., inclusive	.50
Cutting to lengths or diameters under 1 ft.	1.55
No charge for cutting rectangular plates to lengths 3 ft. and over.	

TERMS.—Net cash 30 days.

**Sheets.**—Makers' prices for mill shipments on sheets in carload and larger lots, on which jobbers charge the usual discounts for small lots from store, are as follows: Blue annealed sheets, Nos. 3 to 8, U. S. standard gauge, 1.55c.; Nos. 9 and 10, 1.65c.; Nos. 11 and 12, 1.70c.; Nos. 13 and 14, 1.75c.; Nos. 15 and 16, 1.85c. One pass, cold rolled, box annealed sheets, Nos. 10 to 12, 1.85c.; Nos. 13 and 14, 1.90c.; Nos. 15 and 16, 1.95c.; Nos. 17 to 21, 2c.; Nos. 22, 23 and 24, 2.05c.; Nos. 25 and 26, 2.10c.; No. 27, 2.15c.; No. 28, 2.20c.; No. 29, 2.25c.; No. 30, 2.35c. Three pass, cold rolled sheets, box annealed, are as follows: Nos. 15 and 16, 2.05c.; Nos. 17 to 21, 2.10c.; Nos. 22 to 24, 2.15c.; Nos. 25 and 26, 2.20c.; No. 27, 2.25c.; No. 28, 2.30c.; No. 29, 2.35c.; No. 30, 2.45c. Galvanized sheets, Nos. 10 and 11, black sheet gauge, 2.20c.; Nos. 12, 13 and 14, 2.30c.; Nos. 15, 16 and 17, 2.45c.; Nos. 18 to 22, 2.60c.; Nos. 23 and 24, 2.70c.; Nos. 25 and 26, 2.90c.; No. 27, 3.05c.; No. 28, 3.20c.; No. 29, 3.30c.; No. 30, 3.50c. Painted roofing sheets, No. 28, \$1.55 per square. Galvanized sheets, No. 28, \$2.75 per square for 2½-in. corrugations. All above prices are f.o.b. Pittsburgh, terms 30 days net, or 2 per cent. cash discount 10 days from date of invoice.

**Wrought Pipe.**—The following are the jobbers' carload discounts on the Pittsburgh basing card on wrought pipe, in effect from October 1:

	Butt Weld.	Steel.	Black.	Galv.	Iron.	Black.	Galv.
1 to 1½ in.	75	63	71	59	49	43	
1½ to 2 in.	79	69	75	65	53	47	
2 to 3 in.	80	70	76	66	54	48	
3 to 4 in.	76	66	72	62	50	44	
4 to 6 in.	78	68	74	64	52	46	
6 to 8 in.	77	67	73	63	51	45	
8 to 12 in.	75	65	71	61	50	44	
12 to 15 in.	51½	59	65	55	44	38	
15 to 18 in.	51½	59	65	55	44	38	
18 to 24 in.	76	66	72	62	50	44	
24 to 30 in.	78	68	74	64	52	46	
30 to 36 in.	77	67	73	63	51	45	
36 to 42 in.	75	65	71	61	50	44	
42 to 48 in.	51½	59	65	55	44	38	
48 to 54 in.	51½	59	65	55	44	38	
54 to 60 in.	76	66	72	62	50	44	
60 to 66 in.	78	68	74	64	52	46	
66 to 72 in.	77	67	73	63	51	45	
72 to 78 in.	75	65	71	61	50	44	
78 to 84 in.	51½	59	65	55	44	38	
84 to 90 in.	51½	59	65	55	44	38	
90 to 96 in.	76	66	72	62	50	44	
96 to 102 in.	78	68	74	64	52	46	
102 to 108 in.	77	67	73	63	51	45	
108 to 114 in.	75	65	71	61	50	44	
114 to 120 in.	51½	59	65	55	44	38	
120 to 126 in.	51½	59	65	55	44	38	
126 to 132 in.	76	66	72	62	50	44	
132 to 138 in.	78	68	74	64	52	46	
138 to 144 in.	77	67	73	63	51	45	
144 to 150 in.	75	65	71	61	50	44	
150 to 156 in.	51½	59	65	55	44	38	
156 to 162 in.	51½	59	65	55	44	38	
162 to 168 in.	76	66	72	62	50	44	
168 to 174 in.	78	68	74	64	52	46	
174 to 180 in.	77	67	73	63	51	45	
180 to 186 in.	75	65	71	61	50	44	
186 to 192 in.	51½	59	65	55	44	38	
192 to 198 in.	51½	59	65	55	44	38	
198 to 204 in.	76	66	72	62	50	44	
204 to 210 in.	78	68	74	64	52	46	
210 to 216 in.	77	67	73	63	51	45	
216 to 222 in.	75	65	71	61	50	44	
222 to 228 in.	51½	59	65	55	44	38	
228 to 234 in.	51½	59	65	55	44	38	
234 to 240 in.	76	66	72	62	50	44	
240 to 246 in.	78	68	74	64	52	46	
246 to 252 in.	77	67	73	63	51	45	
252 to 258 in.	75	65	71	61	50	44	
258 to 264 in.	51½	59	65	55	44	38	
264 to 270 in.	51½	59	65	55	44	38	
270 to 276 in.	76	66	72	62	50	44	
276 to 282 in.	78	68	74	64	52	46	
282 to 288 in.	77	67	73	63	51	45	
288 to 294 in.	75	65	71	61	50	44	
294 to 300 in.	51½	59	65	55	44	38	



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Plugged and Reamed.  
1 to 1½ 2 to 3 in. . . . . Butt Weld  
2 2¼ to 4 in. . . . . Lap Weld  
The above discounts are for "card weight," subject to the usual variation of 5 per cent. Prices for less than carloads are three (3) points lower basing (higher price) than the above discounts.

Boiler Tubes.—Discounts on lap welded steel boiler tubes to jobbers in carloads are now as follows:

	Steel.
1½ to 2¼ in. . . . .	65
2½ in. . . . .	67½
3¼ to 3½ in. . . . .	70
3½ to 4½ in. . . . .	72½
5 and 6 in. . . . .	65
7 to 13 in. . . . .	62½

Less than carloads to destinations east of the Mississippi River will be sold at delivered discounts for carloads lowered by two points, for lengths 22 ft. and under; longer lengths, f.o.b. Pittsburgh. Usual extras to jobbers and boiler manufacturers.

Wire Rods and Wire.—Bessemer, open hearth and chain rods, \$29. Fence wire, Nos. 0 to 9, per 100 lb., terms 60 days, or 2 per cent. discount in 10 days, carload lots, to jobbers, annealed \$1.60, galvanized \$1.90; carload lots, to retailers, annealed \$1.65, galvanized \$1.95. Galvanized barb wire, to jobbers, \$2.10; painted, \$1.80. Wire nails, to jobbers, \$1.80.

The following table gives the prices to retail merchants on wire in less than carloads, including the extras on Nos. 10 to 16, which are added to the base price:

	Fence Wire, Per 100 Lb.									
Nos. . . . .	0 to 9	10	11	12	12½	13	14	15	16	
Annealed. . . . .	\$1.75	1.80	1.85	1.90	2.00	2.10	2.20	2.30		
Galvanized. . . . .	2.05	2.10	2.15	2.20	2.30	2.40	2.80	2.90		

Market and Stone Wire in Bundles, Discount from Standard List.

Bright and Annealed:	
9 and coarser. . . . .	80
10 to 18. . . . .	80 and 10
19 to 26. . . . .	80 and 10 and 2½
27 to 36. . . . .	80 and 5
Galvanized:	
9 and coarser. . . . .	75 and 10
10 to 16. . . . .	75 and 10
17 to 26. . . . .	72½ and 10
27 to 36. . . . .	72½
Coppered or Liquor Finished:	
9 and coarser. . . . .	75 and 10
10 to 26. . . . .	75 and 10
27 to 36. . . . .	70 and 10 and 5
Tinned:	
6 to 18. . . . .	75 and 10 and 10

Pittsburgh

PARK BUILDING, May 3, 1911.—(By Telegraph.)

Pig Iron.—The reduction in Lake ore prices has failed so far to stimulate the demand for pig iron. Prices on basic are weaker, a local steel casting concern being reported to have bought about 500 tons for May shipment at \$13.60, Valley furnace, or lower. The United Steel Company, Canton, Ohio, is inquiring for 3000 tons of basic for third quarter delivery, and it seems probable that some low prices will be made by sellers. There is no demand for Bessemer iron, and while the nominal price is \$15, Valley furnace, this is not regarded as firmly held. We quote as follows: Bessemer pig iron, \$15; malleable Bessemer, \$13.75; basic, \$13.60; No. 2 foundry, \$13.75 to \$14, and gray forge, \$13.50, all at Valley furnace, the freight rate to the Pittsburgh district being 90c. a ton.

Steel.—There is no new inquiry. Prices on open hearth billets and sheet bars are weak, small makers offering them at \$1 a ton, and in some cases \$1.50 lower than the prices named by the larger mills: Regular prices, but which do not represent the actual market on open hearth steel, are as follows: Bessemer and open hearth billets, 4 x 4 in. and up to, but not including, 10 x 10 in., at \$23, base, and sheet and tin bars in 30-ft. lengths, \$24; 1½-in. billets, \$24; forging billets, \$28, base, usual extras for sizes and carbons—all prices, f.o.b. Pittsburgh or Youngstown districts, freight to destination added.

(By Mail.)

Extreme dullness continues to characterize the local iron trade, the volume of new business showing a decrease from day to day. Manufacturing plants are not operating to more than 60 per cent. of capacity. Pig iron continues dull. There is very little new demand for billets, which continue to be offered by small open hearth plants at \$1 a ton or

more below the prices quoted by the larger mills. Finished iron and steel are very quiet, the new demand being entirely of a hand-to-mouth nature. The situation could hardly be more unsatisfactory, except that there has so far been no serious break in prices.

Ferromanganese.—A sale of 300 tons of foreign 80 per cent., with deliveries of 50 tons a month over the last half of the year, is reported at \$36.50, Baltimore. We quote 80 per cent. at \$36.50 to \$36.75, Baltimore, the rate for delivery in the Pittsburgh district being \$1.95 a ton.

Ferrosilicon.—The new demand is dull and prices on 50 per cent. are weaker and lower. We quote 50 per cent. at \$52.50 to \$53, Pittsburgh, for delivery through the third quarter; 10 per cent. blast furnace silicon, \$22; 11 per cent., \$24, and 12 per cent., \$25, f.o.b. cars, Ashland and Jisco furnaces.

Muck Bar.—In the absence of sales, we quote best grades, made from all pig iron, at, nominally, \$29, Pittsburgh.

Skelp.—The pipe mills are not operating at present to more than 50 per cent. of capacity, and the consumption of skelp is lighter now than for some months; hence the market is quiet. We quote: Grooved steel skelp, 1.30c.; sheared steel skelp, 1.35c.; grooved iron skelp, 1.60c. to 1.65c., and sheared iron skelp, 1.70c. to 1.75c., all for delivery at consumers' mills in the Pittsburgh district, usual terms.

Wire Rods.—The new demand is light and consumers are not specifying freely against their contracts, in some cases shipments having been held up entirely. There seems to be a surplus supply of rods, and the tone of the market is weaker. We continue to quote Bessemer, open hearth and chain rods at \$29, Pittsburgh.

Steel Rails.—Actual orders and specifications against contracts for light rails received by the Carnegie Steel Company in the past week amounted to about 2500 tons, about double the previous week. The company has also booked some fairly large orders for standard sections for export. No domestic orders for standard sections have been placed in the past week. Prices on light rails are as follows: 12-lb. rails, 1.25c.; 16, 20 and 25 lb., 1.21c. to 1.25c.; 30 and 35 lb., 1.20c., and 40 and 45 lb., 1.16c. The prices are f.o.b., at mill, plus freight, and are the minimum of the market on carload lots, small lots being sold at a little higher price. Standard sections are held at 1.25c. per pound.

Structural Material.—Actual bookings of the American Bridge Company in April showed a slight increase over March. This company has taken about 1600 tons of bridge work for the Piedmont Traction Company and the Greenville, Spartanburg & Anderson, Southern trolley lines. Work on the piers for the steel bridge to be erected by this city at the Point has started, and bids on the steel, about 6000 to 8000 tons, will probably soon be asked for. The hotel project of the Oliver Estate on Smithfield street now looks promising; it is estimated that this will take upward of 15,000 tons of steel. Very low prices continue to be made for fabricated work, but it is stated that the mills are holding firmly to regular prices on plain material. We continue to quote beams and channels up to 15-in. at 1.40c., Pittsburgh.

Plates.—While several fairly large inquiries for steel cars are out, no orders of moment have been placed in the past week. It is expected that the Seaboard Air Line will shortly purchase 1000 box cars with steel underframes and the Chicago, Burlington & Quincy the same number of all steel cars. The gas holder to be built by the Philadelphia Company, which will take about 6000 tons of plates, has been held up. All the plate mills are badly in need of orders. We quote ¼-in. and heavier plates in the wide sizes at 1.40c., but on the narrower sizes it is stated that a few mills are slightly shading this price.

Sheets.—Conditions in the sheet trade continue unsatisfactory, the new demand being dull, and specifications against contracts are not coming in well. Prices continue to be shaded, particularly in the South and Southwest, but hardly enough new business is being offered to test the market thoroughly. Some in the trade believe that a reduction in prices may be made, but nothing official has so far been given out. Regular prices on black, galvanized and roofing sheets, which are being slightly shaded in some cases, are printed on a previous page.

Tin Plate.—The tin plate mills now look for liberal specifications on bright plates from the can makers over the next three months, as this is their busy season. The new demand is dull, and it is estimated that only about 75 per cent. of the tin plate capacity is active at present. At a meeting of the tin plate mills held here last week prices were reported as being fairly well maintained. We quote 100-lb. cokes at \$3.70 per base box, f.o.b. Pittsburgh.

Bars.—The building season has opened quite actively,

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and a larger demand is reported for concrete reinforcing bars, for which the mills have a good deal of business booked. The general demand for both iron and steel bars is quiet, and iron bars are lower, due to the decline in scrap. We quote soft steel bars at 1.40c. and common iron bars at 1.32½c. to 1.35c., Pittsburgh.

**Shafting.**—New orders and specifications against contracts in April showed a falling off as compared with March, and this condition continues. Regular discounts on cold rolled shafting remain at 57 per cent. off in carloads and 52 per cent. in less than carloads, but are not being strictly held.

**Spelter.**—The market is dull and prices have declined. We quote prime grades of Western at 5.20c., East St. Louis, equal to 5.32½c., Pittsburgh.

**Hoops and Bands.**—Specifications against contracts are unsatisfactory, while the new demand is dull. It is estimated that not more than 60 per cent. of mill capacity in hoops and bands is active at present. We continue to quote steel hoops at 1.35c. and bands at 1.40c., extras on the latter as per steel bar card, but it is claimed that these prices are not firmly held in all cases.

**Merchant Steel.**—April showed a marked falling off in new orders and specifications as compared with March. One leading mill reports that its business in April was only about one-half what it was the month before. We quote the higher grades of merchant steels, f.o.b. Pittsburgh, as follows: Iron finished tire, ½ x 1½ in. and heavier, 1.40c., base; under these sizes, 1.55c.; planished tire, 1.60c.; channel tire, 1.80c., base; toe calk, 1.90c.; flat sleigh shoe, 1.55c.; concave or convex, 1.75c.; cutter shoes, tapered or bent, 2.25c.; spring steel, 2c.; machinery steel, smooth finish, 1.90c.

**Rivets.**—Consumers are ordering only such quantities as are required to meet current needs. None of the makers is operating full, and some of them to only 50 per cent. of capacity. We quote structural rivets at 1.75c. to 1.80c., and boiler rivets, 1.85c., Pittsburgh.

**Wire Products.**—The wire trade is about as dull now as any of the other lines of finished product. Jobbers and retailers are merely placing orders for such quantities of nails and wire as are absolutely needed, keeping their stocks as light as possible, looking for lower prices if conditions do not improve. We quote galvanized barb wire at \$2.10; painted, \$1.80; annealed fence wire, \$1.60; galvanized, \$1.90; wire nails, \$1.80, and cut nails, \$1.60, f.o.b. Pittsburgh, full freight to destination added.

**Spikes.**—There are no large inquiries in the market. The base price of railroad spikes is \$1.60, Pittsburgh.

**Merchant Pipe.**—Advises are that the Guaranty Pipe Line Company of California will not build its oil line at present and the inquiry has been withdrawn. The pipe market is quiet, jobbers placing only occasional carload orders to meet current needs and maintain a full assortment of sizes. In spite of the light demand, it is stated that discounts on both iron and steel pipe, printed on a previous page, are being firmly held.

**Boiler Tubes.**—Most consumers of tubes being covered by contracts up to July 1, the new demand is light. The new list and classification on steel boiler tubes, printed on a previous page, are being well maintained.

**Coke.**—Coke makers realize that the output has been too heavy for some time, and are putting out ovens at a pretty lively rate. A good deal of coke is being stocked and the new demand is dull. There are no inquiries in the market for furnace coke, but several large consumers of foundry coke are figuring on their requirements for the last half of the year. The output of coke in the Upper and Lower Connellsville regions for the first three months of 1911 is estimated at 4,242,574 net tons, a decrease over the first quarter of 1910 of nearly 2,000,000 tons. The output for last week showed a falling off of nearly 36,000 tons, as compared with the previous week. Low prices continue to be made on furnace coke loaded on cars and has to be moved. In some cases such coke has sold at \$1.40 to \$1.45 per net ton at oven, but this cannot be regarded as the market. We quote standard makes of furnace coke for May and June shipment at \$1.60 to \$1.65, and for delivery over the last half of the year, at \$1.75 to \$1.85 in net tons at oven. We quote standard makes of 72-hour foundry coke at \$1.90 to \$2 for spot shipment, and \$2.15 up to \$2.40 in net tons at oven for delivery over second half of the year.

**Iron and Steel Scrap.**—There seems to be no scrap market, consumers not needing material, with some holding up shipments, while dealers are not trying to press sales, knowing that it would be useless to do so under present conditions. Embargoes on scrap are still on at Follansbee, W. Va., and Monessen, Pa., and this is serving to make the local situation worse than it would be otherwise. In the absence of actual sales prices are largely nominal.

Dealers quote as follows, per gross ton, f.o.b. Pittsburgh, or elsewhere as noted:

Heavy steel scrap, Steubenville, Follansbee, Sharon, Monessen and Pittsburgh delivery.....	\$12.50 to \$12.75
No. 1 foundry cast.....	13.75 to 14.00
No. 2 foundry cast.....	12.75 to 13.00
Bundled sheet scrap, at point of shipment.....	9.00 to 9.25
Rerolling rails, Newark and Cambridge, Ohio, and Cumberland, Md.....	14.50
No. 1 railroad malleable stock.....	12.50 to 12.75
Grate bars.....	10.50 to 10.75
Low phosphorus melting stock.....	16.75 to 17.00
Iron car axles.....	24.25 to 24.50
Steel car axles.....	18.50 to 18.75
Locomotive axles.....	23.00
No. 1 busheling scrap.....	12.50 to 12.75
No. 2 busheling scrap.....	9.00 to 9.25
Old car wheels.....	13.50 to 13.75
Sheet bar crop ends.....	15.50 to 15.75
*Cast iron borings.....	8.60 to 8.75
*Machine shop turnings.....	9.15 to 9.40
Old iron rails.....	16.00 to 16.25
No. 1 wrought scrap.....	14.25 to 14.50
Heavy steel axle turnings.....	10.25
Stove plate.....	10.50 to 10.75

\* These prices are f.o.b. cars at consumers' mill in the Pittsburgh district.

### Philadelphia

PHILADELPHIA, PA., May 2, 1911.

Consumers show little interest in the market. Even small lot buying of pig iron has decreased. A moderate demand for heavy steel plates is reported, but structural material has been less active. Bars are dull. Very little business has been done in old material, with a downward tendency in a number of grades.

**Iron Ore.**—A waiting market prevails. Consumers, owing to the quiet condition of the iron trade, show hesitancy in placing contracts for ore and no sales of any importance have been reported. Importations during the week ending April 30 included 5458 tons of Spanish, 12,430 tons of Newfoundland and 10,400 tons of Cuban ore.

**Pig Iron.**—The movement continues light. Consumers are still taking deliveries freely on contracts already placed, but show little interest in purchasing for extended delivery, and the customary inquiries which usually follow a drop in ore prices, if only for the purpose of testing the market, have failed to materialize. Producers are watching the situation closely and contend that no reduction in price will be made for standard brands of foundry iron. Several merchant furnaces, including Carbon and Sheridan, are to be blown out this week, and further curtailment has been considered, but not definitely decided upon. The reports of the Eastern Pig Iron Association and the Virginia Pig Iron Association, both organizations holding their regular monthly meetings in this city this week, are awaited with interest. While no actual reduction in the price of standard brands of foundry iron is reported, the range of the market is narrower and the usual 50c. differential between No. 2 X and No. 2 plain has in several cases been narrowed down to 25 cents a ton. Sales of No. 2 X and No. 2 plain foundry grades have been light and confined largely to immediate requirements, with prices for No. 2 X ranging from \$15.50 to \$15.75, delivered. An odd lot may still go at the recent top of the market, \$16, but this quotation is no longer general. Negotiations are pending for a round lot of low grade foundry iron, pipe makers figuring against prospective business, but no sales of importance are reported. In a few instances better sales of Virginia foundry iron have been made, stove foundries and machinery makers taking lots ranging from 100 to 400 tons for delivery in June, July and August, at \$13, furnace, for No. 2 X. There has been little done in forge iron; rolling mills are not active and show little interest in the market. The range of prices for this grade has also narrowed and \$14.75 to \$15 now about represents the market. While the leading consumers of basic pig iron are not buying, the purchaser in the central part of the State who bought 1000 tons last week at \$15, delivered, has taken on another lot of the same quantity and at the same price. Some Eastern basic makers would take business at that level, although the quotation is not general. The demand for low phosphorus iron has been meager and sellers will accept business at prices below recent quotations: \$21, delivered, can be done for standard grade, delivered in this district. The following range of quotations about represents the market for standard brands, second and third quarter delivery, in buyers' yards in this vicinity:

Eastern Pennsylvania, No. 2 X foundry.....	\$15.50 to \$15.75
Eastern Pennsylvania, No. 2 plain.....	15.25 to 15.50
Virginia, No. 2 X foundry.....	15.50 to 16.00
Virginia, No. 2 plain.....	15.80 to 16.00
Gray forge.....	14.75 to 15.00
Basic.....	15.00
Standard low phosphorus.....	21.90 to 21.50



# THE IRON AND METAL MARKETS

**Ferromanganese.**—Negotiations are still pending for a lot of several hundred tons for an Eastern consumer, but no fresh inquiry is reported. Prices remain unchanged, at \$36.50 to \$37, Baltimore, for 80 per cent., delivery ranging from second quarter to last half of the year.

**Billets.**—Consumers continue to place small orders for prompt shipment, the maximum being about 100 tons. Mills get enough business, however, to enable them to maintain about an even rate of production. Notwithstanding reports of concessions in other districts, local makers are adhering firmly to recent quotations—\$25.40 for open hearth rolling billets and \$30.40 for ordinary forging billets, delivered in this vicinity.

**Plates.**—Business continues of a small lot character. Some mills report the volume taken during the past few weeks to have been maintained, but a falling off is reported by others. Boiler steel appears to be in active demand, with a fair amount of car and bridge work also coming out. Makers hold prices firmly, the minimum being 1.55c. for ordinary plates, delivered here.

**Structural Material.**—Actual orders placed during the week have been less numerous, although both makers of plain shapes and fabricators are figuring on considerable business. The major portion of the work under negotiation comes from surrounding districts, new business in this territory being small and of a miscellaneous character. The demand for plain shapes is somewhat easier, although prices are fully maintained at 1.55c., delivered in this vicinity.

**Sheets.**—Conditions are still unsatisfactory to the mills; orders continue small individually, and makers are unable to gauge mill operations except for a few days ahead. Consumers show no disposition to contract, but place small orders for prompt delivery covering immediate needs. Eastern mill quotations for prompt shipments range as follows: Nos. 18 to 20, 2.50c.; Nos. 22 to 24, 2.60c.; Nos. 25 and 26, 2.70c.; No. 27, 2.80c.; No. 28, 2.90c.

**Bars.**—A very small amount of new business has been placed, and mills in almost every case are anxious for business, but are not willing to make any further concession in the price of refined iron bars. Consumers hold off, waiting for a firm basis before making large purchases. Specifications against contracts for steel bars are not coming out very freely. Prices are unchanged, refined iron bars being quoted at 1.32½c. to 1.37½c., delivered in this vicinity, with steel bars at 1.55c., delivered.

**Old Material.**—Buying has been lighter and in many grades transactions have not been sufficient to establish a market. Some cancellations of orders are noted. One Eastern consumer of wrought pipe has made heavy cancellations, while those against undelivered portions of contracts for heavy melting steel have probably not been as extensive as was anticipated. No. 1 heavy melting steel, from the consumer's viewpoint, is on a strictly \$13, delivered, basis, although for choice material \$13.25 will in instances be paid, and as high as \$13.50 has been done on transactions between dealers. In the latter case deliveries apply on old high priced contracts. One lot of 1000 tons of low phosphorus scrap was sold last week at \$17.50, but the market to-day is slightly lower. Railroad lists have not all come out, but such as have been received show a reduced tonnage. Old iron rails have been sold at a slightly lower level, but special grades are, as a rule, inactive. Prices generally are quoted lower than last week, largely against buyers' offers or in comparison with other grades. The following range of prices about represents sellers' ideas of the market for deliveries in consumers' yards, eastern Pennsylvania and nearby points, carrying a freight rate from Philadelphia ranging from 35c. to \$1.35 per gross ton:

No. 1 heavy melting steel scrap.....	\$13.00 to \$13.25
Old steel rails, rerolling.....	14.25 to 14.75*
Low phosphorus heavy melting steel scrap .....	17.25 to 17.75
Old steel axles.....	20.00 to 20.50
Old iron axles.....	25.00 to 26.00*
Old iron rails.....	16.75 to 17.25
Old car wheels.....	13.00 to 13.50
No. 1 railroad wrought.....	16.00 to 16.50
Wrought iron pipe.....	13.00 to 13.50
No. 1 forge fire.....	10.75 to 11.25
No. 2 light iron.....	7.00 to 7.50*
Wrought turnings.....	8.25 to 8.75
Cast borings.....	7.75 to 8.25
Machinery cast.....	13.25 to 13.75
Railroad malleable.....	12.00 to 12.50
Gate bars, railroad.....	11.50 to 12.00
Stove plate.....	10.50 to 11.00

\* Nominal.

**Coke.**—Several 1000-ton contracts for foundry coke, for delivery over the remainder of the year, have been closed at prices varying from \$2.25 to \$2.40 per net ton, at oven. Moderate sales of spot foundry coke at \$2, at oven, are also reported. Little movement in furnace coke is to be noted. Furnaces are unwilling to make large contracts, owing to the uncertainty of the iron market, and, as a rule, con-

fine their purchases to prompt lots, which are freely offered at \$1.55 to \$1.65, at oven. The following range of prices is named per net ton, for deliveries in this vicinity:

Connellsville furnace coke.....	\$3.70 to \$4.05
Foundry coke.....	4.15 to 4.55
Mountain furnace coke.....	3.30 to 3.65
Foundry coke.....	3.75 to 4.15

The U. S. Metal & Mfg. Company, whose main office is at 165 Broadway, New York, has for about four years been maintaining an office at Lebanon, Pa., formerly in charge of Edward Boughter, who died in March, 1910, since which time it has been under the management of L. Weyer Murray. Owing to important changes which have occurred in business in the past year or two, the company has decided to transfer the Lebanon office to Philadelphia, where quarters have been secured in the Morris Building. The Philadelphia office is in charge of Mr. Murray, who will have a corps of competent assistants.

## Cleveland

CLEVELAND, OHIO, May 2, 1911.

**Iron Ore.**—The prediction of ore firms that the establishment of prices would not cause a very active buying movement is being realized. Quite a number of sales of non-Bessemer grades are being made in small lots, but the aggregate tonnage sold, exclusive of reservations made before the fixing of prices, is not large. Furnacemen are showing more desire than usual to secure bargains this season. The demand for off grade ores is fairly good, as compared with standard ores. A fair tonnage of low grade ores has been sold in the East. Prices on these ores range from 10c. to 15c. below those that prevailed last year, but low grade ores were sold at a low figure during 1910. One independent ore firm, with a rather limited tonnage, which in the past has shaded the market, is selling old range non-Bessemer at a concession of about 20c. from regular prices. Lake freight rates on ore have finally been fixed at a reduction of 10c. a ton from last season's rates. The rates this year will be 60c. a ton from the head of the lakes, 55c. from Marquette and 45c. from Escanaba. Not much chartering has been done. Very little ore is being moved yet. The Pittsburgh Steamship Company has placed all but 10 of its vessels in commission, and expects to have the remainder in operation by the end of the week. We quote prices as follows: Old range Bessemer, \$4.50; Mesaba Bessemer, \$4.25; old range non-Bessemer, \$3.70; Mesaba non-Bessemer, \$3.50.

**Pig Iron.**—The market is almost lifeless. Foundries are well supplied for their second quarter requirements, and few are ready to buy for the last half. Only two inquiries are reported, one for 500 tons of Northern iron and the other for 300 tons of Southern, both for the last half. An inquiry from Chicago for 3000 tons of basic has been withdrawn from the market. One furnace interest is offering basic for the third quarter delivery at the current price of \$13.75. In spite of the dullness and the reduction in ore prices the market is generally firm at recent quotations. Last half quotations on foundry grades, however, are largely nominal, and it is probable that an inquiry for a fair tonnage would bring out quotations at about the current market price, or from 25 to 50 cents lower than most of the furnaces are now asking for that delivery. Southern foundry iron is now being quite generally quoted at \$11, Birmingham, for No. 2 for delivery through the last half. For prompt shipment and the second quarter, we quote, delivered Cleveland, as follows:

Bessemer .....	\$15.90
Basic .....	14.25
Northern foundry, No. 1.....	14.50
Northern foundry, No. 2.....	14.25
Gray forge.....	13.50
Southern foundry, No. 2.....	15.35
Jackson Co. silvery, 8 per cent. silicon.....	18.00

**Coke.**—Foundries are well supplied for the present and are not ready to contract for their last half requirements. Prices are stationary. We quote standard Connellsville furnace coke at \$1.60 to \$1.65, per net ton, at oven, for spot shipment, and \$1.75 to \$2 for the last half. Connellsville 72-hour foundry coke is held at \$2 for prompt shipment and \$2.25 to \$2.50 for the last half.

**Finished Iron and Steel.**—The demand in finished lines is less active. Mill agencies are getting a fair volume of orders, but they are nearly all for small tonnages. Inquiries for round lots are lacking. Buyers are placing orders only for their immediate needs. Very few contracts are being placed for delivery after July 1. Buyers feel certain that prices will go no higher, so they see no advantage in placing contracts. Only a moderate volume of structural work is coming out, and local shops are only fairly busy. The King

# THE IRON AND METAL MARKETS

Bridge Company, Cleveland, has taken the contract for 1100 tons from the Nickel Plate Railroad, for grade crossing elimination work in East Cleveland. The same company was low bidder on 800 tons for bridge work in East St. Louis. The McMyler Interstate Company, Cleveland, was low bidder on 475 tons for the Dunham road grade crossing elimination work near Cleveland, bids for which were received by the County Commissioners. That company's bid was \$59.60 per ton, erected. Steel bars and structural material are firm, at 1.40c., Pittsburgh. The demand for sheets is not active. Most of the sheet business is being taken at price concessions, the maximum shading being \$1 a ton. The 57 per cent. discount on shafting is not being firmly adhered to. The demand for iron bars continues light. While most mills are adhering to a minimum quotation of 1.30c., this has been shaded to 1.25c., at mill, on a 200-ton order during the week.

**Old Material.**—As a result of the continued inactivity prices on nearly all grades have suffered another sharp decline of from 50c. to \$1 a ton. Prices are said to be lower in the local market now than at any time in the past seven years. The only demand is for small lots, and with the present condition of the market dealers do not appear anxious either to buy or sell. Local mills are offering only \$11.25 for heavy melting steel. The Wheeling & Lake Erie Railroad closed May 2 on about its usual tonnage. Dealers' prices per gross ton, f.o.b. Cleveland, are as follows:

Old steel rails, rerolling.....	\$13.00 to \$13.50
Old iron rails.....	15.00 to 15.50
Steel car axles.....	17.50 to 18.00
Heavy melting steel.....	11.00 to 11.50
Old car wheels.....	11.50 to 12.00
Relaying rails, 50 lb. and over.....	22.50 to 23.50
Agricultural malleable.....	11.00 to 11.50
Railroad malleable.....	11.75 to 12.25
Light bundled sheet scrap.....	7.50 to 8.00

The following prices are per net ton, f.o.b. Cleveland:

Iron car axles.....	\$21.00 to \$21.50
Cast borings.....	6.00 to 6.25
Iron and steel turnings and drillings..	6.25 to 6.50
Steel axle turnings.....	8.00 to 8.50
No. 1 busheling.....	9.50 to 10.00
No. 1 railroad wrought.....	11.50 to 12.00
No. 1 cast.....	11.25 to 11.50
Stove plate.....	10.25 to 11.50
Bundled tin scrap.....	11.00 to 11.50

## Birmingham

BIRMINGHAM, ALA., May 1, 1911.

**Pig Iron.**—The pipe makers continue to pick up odd lots of the lower grades when such offer, while there have been a few sales of regular foundry iron; but the volume of new business actually put on the books remains small. Shipments are not quite up to the month of March, yet it will take an actual canvass of the situation this week to determine the relative position of stocks on hand May 1, as compared with April 1. One foundry furnace blew out last night, and this will have its effect on the market, no doubt. The Birmingham schedule of prices remains unchanged at the following figures, per ton of 2240 lb., on board cars at furnaces in this immediate district:

No. 1 foundry and No. 1 soft.....	\$11.50
No. 2 foundry and No. 2 soft.....	11.00
No. 3 foundry.....	10.50
No. 4 foundry.....	\$10.00 to 10.25
Gray forge.....	9.50 to 9.75
Standard basic, chill cast.....	11.00
"Off" basic.....	10.50
Charcoal car wheel iron.....	22.50

**Cast Iron Pipe.**—A nice tonnage is up for consideration from Kansas City, and it is expected that Birmingham foundries will land the order the current week. Aside from this there is little tonnage of moment before the trade. Shipments remain fairly good. There has been no increase in stocks on producers' yards during April; in fact, it appears an actual reduction has been effected. Quotations remain as follows, per net ton, f.o.b. foundries here: 4 to 6 in., \$22.50 to \$23; 8 to 12 in., \$22; over 12 in., average \$21, with \$1 higher for gas pipe.

**Old Material.**—The scrap market has little of interest to offer the news gatherer. Dealers are not optimistic, but prices are firmly held. There is so little business moving that it is hard to really establish a market, but ruling prices are about as follows, per gross ton, 2240 lb., on board cars here:

Old iron axles (light).....	\$14.50 to \$15.00
Old steel axles (light).....	13.50 to 14.00
Old iron rails.....	13.00 to 13.50
No. 1 railroad wrought.....	12.00 to 12.50
No. 2 railroad wrought.....	10.50 to 11.00
No. 1 country wrought.....	8.00 to 8.50
No. 2 country wrought.....	7.50 to 8.00
No. 1 machinery.....	10.50 to 11.00
No. 1 steel.....	9.50 to 10.00
Tram car wheels.....	9.00 to 9.50
Standard car wheels.....	10.50 to 11.00
Light cast and stove plate.....	8.00 to 8.50

## Cincinnati

CINCINNATI, OHIO, May 3, 1911.—(By Telegraph.)

**Pig Iron.**—A local firm calls attention to May as being the month of changes and predicts that the turning point has been reached. Generally speaking, this prediction is in line with the opinion of the majority of pig iron merchants here. While business is quieter, underlying conditions indicate that the turn will be for the better, although contrary reports are circulating, which are discouraging for any immediate improvement. Contract iron is moving freely, but the new inquiry is light and a scanty business is being booked either for prompt or deferred shipment. Quite a number of jobbing foundries in this vicinity have comparatively light stocks on hand, but as their melt is less than usual they are holding back making future contracts, and it would probably take a decided improvement in general business conditions to bring them into the market as heavy purchasers. A local manufacturer bought about 500 tons of foundry iron, divided equally between Northern and Southern, all for last half shipment. For the same delivery an Indiana consumer took 500 tons of Northern No. 2 foundry, and a small lot of gray forge for prompt movement also recently changed hands. Malleable and basic are not in demand. Among recent inquiries from some Central Western melters is one for 1000 tons of No. 2 Southern, for May, June and July shipment, and another for 300 tons of No. 1 Northern foundry. Reports that prices have been shaded on both Northern and Southern foundry iron for prompt shipment are not without some foundation. Special conditions, however, generally prevailed, and for the regular standard brands we continue our quotations of \$11, Birmingham, and \$14, Ironton, for either prompt or last half shipment. Based on freight rates of \$3.25 from Birmingham and \$1.20 from Ironton, we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 foundry.....	\$14.75
Southern coke, No. 2 foundry.....	14.25
Southern coke, No. 3 foundry.....	13.75
Southern coke, No. 4 foundry.....	13.50
Southern coke, No. 1 soft.....	14.75
Southern coke, No. 2 soft.....	14.25
Southern gray forge.....	13.00
Ohio silvery, 8 per cent. silicon.....	17.70
Lake Superior coke, No. 1.....	15.70
Lake Superior coke, No. 2.....	15.20
Lake Superior coke, No. 3.....	14.70
Basic, Northern.....	\$15.20 to 15.45
Standard Southern car wheel.....	25.25
Lake Superior car wheel.....	19.50

(By Mail.)

**Coke.**—The inquiry mentioned last week for about 600 tons of 48-hour coke per month is unclosed; this is understood to be for a nearby gas plant. There is also wanted between 2000 and 4000 tons of foundry coke, deliveries to run through the next 12 months. On account of the slack demand, Connellsville furnace coke, for spot shipment, has sold as low as \$1.40 per net ton, at oven, but the coke was on cars and had to be moved; the regular quotable figure is considerably higher. Pocahontas and Wise County furnace coke remain around \$1.65 to \$1.75, the first named figure representing prompt shipment quotations. Foundry coke is about the same in all three districts, \$1.95 to \$2 being quoted on 72-hour coke for prompt movement, with a premium of about 25c. per ton asked for contracts.

**Finished Material.**—With the exception of a moderate demand for small lots of steel bars and structural material from warehouse, there has been very little of note to report in this market. It is true that there are a number of large structural contracts in sight, but specifications will not be made up for any of them for some time to come. Hoops and bands continue very quiet. Manufacturers are evidently firm in their intention to adhere to the published mill base price of 1.40c., Pittsburgh, and local warehouses are quoting 1.90c. to 2c.

**Old Material.**—The past week has been an extremely dull one, and prices have not been well maintained. The rolling mills and foundries are not disposed to buy any large quantities of scrap, and as dealers have fairly good-sized stocks on hand they are indifferent about making any scramble for such material as is offered. Some change has been made in present market quotations, as will be noted below. Prices for delivery in buyers' yards, southern Ohio and Cincinnati, are as follows:

No. 1 railroad wrought, net ton.....	\$11.50 to \$12.00
Cast borings, net ton.....	4.50 to 5.00
Steel turnings, net ton.....	5.75 to 6.25
No. 1 cast scrap, net ton.....	9.75 to 10.00
Burnt scrap, net ton.....	7.00 to 7.50
Old iron axles, net ton.....	16.50 to 17.00
Bundled sheet scrap, gross ton.....	7.50 to 8.50
Old iron rails, gross ton.....	13.50 to 14.00
Relaying rails, 50 lb. and up, gross ton.....	21.00 to 22.00
Old car wheels, gross ton.....	11.00 to 12.00
Heavy melting steel scrap, gross ton.....	10.00 to 10.50



# THE IRON AND METAL MARKETS

## St. Louis

ST. LOUIS, May 1, 1911.

Quietness prevails in pig iron and coke. In the former intending buyers are holding out of the market, and in the latter many of the large consumers have during the past few weeks contracted for requirements for some months ahead. Considerable activity is noted in the promotion of new steam and interurban railroads and extensions of existing steam railroads in the Southwest.

**Pig Iron.**—The market for pig iron continues extremely quiet. The few sales made were for small tonnage, principally for prompt delivery. An inquiry is out from an Illinois foundry for 500 to 1000 tons each of malleable and No. 2 foundry for last quarter delivery; 300 tons of No. 2 foundry for last half delivery; 150 tons of No. 1 soft for immediate shipment and 100 tons of No. 2 foundry for last half delivery. In the case of one inquiry for 2000 tons, the buyer states that he is not inclined to execute a contract at present. We quote the market unchanged, as follows; Southern No. 2 foundry, \$11, Birmingham, for any shipment prior to January, 1912, except for fourth quarter only, which is held at \$11.50; No. 2 Northern, \$14, Ironton, Ohio, for any delivery except last quarter, which is held at \$14.50.

**Coke.**—There is very little doing, the inquiries and sales for the week being confined to small lots for spot delivery. Several of the large buyers in St. Louis and St. Louis territory have during the past 60 days covered their wants for several months. Specifications on contracts are coming in satisfactorily. The market is steady, with prices ranging from \$2.10 to \$2.30 per net ton for selected Connellsville 72-hour foundry at oven; carload lots 25c. per ton higher.

**Finished Iron and Steel.**—The leading interest reports an increased demand for structural material, though the tonnage is not heavy. Bars have been slightly better, with some increase in the inquiry from wagon and agricultural implement manufacturers. An Oklahoma railroad is in the market for 500 tons of standard rails. On light rails the coal companies are showing more interest and the tonnage purchased the past week was gratifying. Track fastenings have been in fair demand, orders being distributed between trunk lines and logging roads.

**Old Material.**—Market conditions in scrap iron and steel continue unchanged. Business is almost wholly confined to dealers, who still have some orders to fill. Conditions with the mills are not very satisfactory and they show but little disposition to do any buying at present. The only railroad list out the past week is the Missouri Pacific, of approximately 2000 tons. Prices are unchanged. We quote dealers' prices, per gross ton, f.o.b. St. Louis:

Old iron rails.....	\$13.00 to \$13.50
Old steel rails, rerolling.....	11.75 to 12.25
Old steel rails, less than 3 ft.....	10.75 to 11.25
Relaying rails, standard sections, subject to inspection.....	23.00 to 23.50
Old car wheels.....	12.50 to 13.00
Heavy melting steel scrap.....	10.75 to 11.25
Frogs, switches and guards, cut apart..	10.75 to 11.25

The following quotations are per net ton:

Iron fish plates.....	\$10.75 to \$11.25
Iron car axles.....	17.00 to 17.50
Steel car axles.....	16.75 to 17.25
No. 1 railroad wrought.....	10.75 to 11.25
No. 2 railroad wrought.....	9.75 to 10.25
Railway springs.....	9.50 to 10.00
Locomotive tires, smooth.....	16.00 to 16.50
No. 1 dealers' forge.....	9.00 to 9.50
Mixed borings.....	4.50 to 5.00
No. 1 bushelling.....	9.00 to 9.50
No. 1 boilers, cut to sheets and rings..	7.75 to 8.25
No. 1 cast scrap.....	10.00 to 10.50
Stove plate and light cast scrap.....	8.50 to 9.00
Railroad malleable.....	8.50 to 9.00
Agricultural malleable.....	7.50 to 8.00
Pipes and flues.....	8.00 to 8.50
Railroad sheet and tank scrap.....	7.50 to 8.00
Railroad grate bars.....	8.00 to 8.50
Machine shop turnings.....	6.50 to 7.00

## San Francisco

SAN FRANCISCO, April 26, 1911.

Local handlers of steel products are at a loss to understand the continued quietness of the market. The primary wealth-producing industries of the coast are in very satisfactory shape, and there is plenty of money in the banks, but the fact remains that most buyers of steel products are not coming into the market to as large an extent as usual at this season. A normal movement is noted in some departments, such as cast iron pipe, rails and wire products, but in other lines conditions are about the same as for some time. A few fairly large orders are coming out, but such business is not sufficient to compensate for the dullness in the smaller distributive trade. Both consumers and merchants are anxious to limit their supplies as closely as possible,

in the apparent expectation of weakness in the primary markets.

**Bars.**—The demand for soft steel bars continues very limited. Some of the larger consumers appear to be fairly busy, and are placing occasional orders, though as a rule their purchases cover only requirements of the near future. There is no animation to the small trade, and orders from merchants consist mainly of small lots for sorting-up purposes. Supplies of foreign material are somewhat in excess of requirements. The demand for reinforcing material is slowly increasing, and there is still some expectation of an active movement in the summer, though there is no strength to the market at present. The Benicia, Cal., Arsenal will receive bids May 1 for bars required during the fiscal year, and the city of Los Angeles is placing occasional orders for aqueduct work. Steel bars of coast manufacture are not expected to be much of a factor for some time, but a considerable tonnage of local iron bars is offered. There is a rather easy feeling in regard to prices from store, though quotations remain at 2c. for steel and 1.90c. for iron.

**Structural Material.**—General building is fairly active in most of the coast cities, though steel structures are not much in evidence, either in number or size. New local contracts include the Mount St. Joseph's Orphanage, about 500 tons, let to the Ralston Iron Works, and a small job for the Dominican Fathers at Pine and Steiner streets, taken by the Central Iron Works. The McClintic-Marshall Construction Company has taken the Security Savings Bank contract in Oakland, requiring about 600 tons. New figures are being taken on some projects which have been in view for some time. Fabricators are greatly dissatisfied over the action of certain builders, who have taken figures several times without placing their orders. Specifications for the Oakland city hall have been placed in the hands of the contractors, and the date for opening bids has been postponed to May 22. There is some talk of a number of buildings in prospect, both here and in the north coast cities, but the number of actual inquiries is small. It is reported that the Southern Pacific Railroad will shortly build a large passenger station at Sacramento, Cal. The California Wine Association is planning to add a new wing to its large steel and concrete building at Winehaven, near Richmond, Cal. Figures are being taken on a number of steel bridges, mostly of a small nature.

**Rails.**—Light rails have been rather quiet the last two weeks, some of the business expected having failed to materialize. Orders for heavy rails continue fairly numerous, with occasional inquiries from logging interests and a good demand from the smaller lines in all the coast States. There is some prospect of business from a few interurban projects which have been under consideration for several years. The Southern Pacific and allied interests are acquiring numerous franchises and rights of way, on which actual development may be started at any time. Bids have been received on a large lot of switches, and specials for the Geary street municipal line.

**Sheets.**—There is little feature to the jobbing trade, the movement, though fair, being hardly up to expectations. Few orders are being placed by merchants, who are carrying ample supplies for current needs.

**Plates.**—A good volume of business is anticipated for the summer season, and some improvement has been noted in the last few weeks. The principal business in prospect is in connection with several large hydroelectric projects, and some small orders have already been placed for work of this nature. Manufacturers of small oil tanks, &c., are well occupied, and are buying on a moderate scale. The city of Los Angeles will receive bids May 26 for steel and rivets for 1865 ft. of steel pipe, 9 ft. 3 in. diameter; 5163 ft., 10 ft. diameter, and 8313 ft., 11 ft. diameter. It is reported that the Western Water Company will erect a 110,000 barrel steel water tank near Taft, Cal.

**Merchant Pipe.**—No perceptible increase is noted in the demand from the small consuming trade, and merchants are accordingly buying in a very limited way. Supplies are not excessive, but appear ample for all current needs. As far as can be learned, bookings by mill representatives throughout the State are considerably smaller than last month, sales in the oil fields being of little consequence. According to some reports, small inquiries in that quarter are increasing, but no large business is expected for some time. There is some talk of a gas line in southern California which may result in a substantial order, but there is nothing definite about the project as yet. The city of Los Angeles is taking bids on 60,000 ft. of ½-in. and 10,000 ft. of ¾-in. galvanized pipe. The town of Corning, Cal., will take bids May 2 on a lot of pipe for its water system.

**Cast Iron Pipe.**—Business continues to come out in good volume, both from municipalities and private corporations. While recent business has been principally in small lots, inquiries on several large projects are expected in the

## THE IRON AND METAL MARKETS

near future, from northern as well as California points. The San Francisco Gas and Electric Company has placed a fair order, and the Pacific Gas & Electric Company is buying considerable pipe for delivery to various parts of the State. The United States Pipe Company has taken an order for 200 tons for a line connecting two parks in San Francisco. The city of San Diego is figuring on extensive improvements to its water system, on which about \$340,000 will be spent, and the San Diego Consolidated Gas & Electric Company is also expected to place a large order shortly. The city of Portland, Ore., will take bids May 9 for about 1500 tons, and the city of Vancouver, B. C., will open bids on a lot of 18-in. pipe May 31. The city of Prince Rupert, B. C., has plans for a water system, with a capacity of 4,500,000 gal. daily.

**Pig Iron.**—The local movement continues on about the same scale as for some time, few of the larger foundries being operated at anything like their capacity. Some melters working on special lines of machinery castings are fairly busy, but only a moderate tonnage of pig iron is required, and considerable difficulty is experienced in selling large lots to arrive. No. 2 Southern foundry iron is valued at \$21 to \$22, but very little is used here. Importers quote about \$23 for all ordinary foundry grades of English, Continental and Chinese iron, though some concession could probably be obtained on round lots to arrive.

**Old Material.**—Aside from an export movement of steel scrap, there is little feature to the market. There is but little local demand for cast scrap, but prices remain steady in the absence of large offerings. The principal requirements of steel melting scrap are covered by former sales, though some new business is expected shortly, and recent shipments have relieved the market of all burdensome supplies. There is little movement of wrought scrap, and the demand for rerolling rails is limited. Quotations are as follows: Cast iron scrap, per net ton, \$18; steel melting scrap, per gross ton, \$11 to \$12; wrought scrap, per net ton, \$12 to \$15; rerolling rails, per net ton, \$15.

The Crane Company has purchased the lot and one-story brick building adjoining its new building at Second and Brannan streets.

The Swartz & Cooper Iron & Metal Company has made application in the Superior Court for dissolution.

### Buffalo

BUFFALO, N. Y., May 2, 1911.

**Pig Iron.**—With the exception of one order for 5000 tons of No. 4 iron from a pipe making interest, taken since last week's report, and another for 5000 tons No. 2 foundry for a radiator concern for second and third quarter delivery, sales have been comparatively light the past week, running mostly in carload to 300-ton lots with a small total and to cover short time requirements. Inquiry has tapered off perceptibly; such requests for quotations as are being received being to a large extent in the nature of feeling the market apparently and chiefly for more extended deliveries than furnaces care to consider. The price situation remains the same as last week. We quote as follows, f.o.b. Buffalo:

No. 1 X foundry.....	\$14.25 to \$14.75
No. 2 X foundry.....	14.00 to 14.50
No. 2 plain.....	13.75 to 14.00
No. 3 foundry.....	13.50 to 13.75
Gray forge.....	13.25 to 13.50
Malleable.....	14.00 to 14.50
Basic.....	14.25 to 14.75
Charcoal.....	16.75 to 17.50

**Finished Iron and Steel.**—The most active line is structural material, in which a good total of new business is developing. Plates and bar products were quieter during the forepart of the week; but during the past two or three days new inquiry has been coming in quite freely, and a number of moderate sized orders in bar products have been placed, including one of 200 and one of 300 tons. Some business has also been done in light rails and rails for traction companies. Specifications on contracts for the Canadian export trade are coming in quite freely; but the aggregate of new orders from Canadian points has been less this week than during the preceding week. In fabricated structural lines a number of new building projects are developing. Plans are on architects' boards for the Marine Bank Building, a bank and office structure, 12 or 14 stories, of large dimensions, to be erected at Main, Seneca and Washington streets. Bids will not be asked, however, until leases on buildings at present on the site expire, which have several months to run. Bids will soon be received for steel for another factory building, requiring about 100 tons, to be erected by the Eastman Kodak Company, Rochester, to be known as Building No. 28, in addition to Building No. 43, mentioned last week, requiring 350 tons, for which bids have just been sent in. Contract for the 400

tons of steel for the Hickey-Freeman Company's clothing manufacturing building, Rochester, went to F. L. Hughes, of that city. The Charles Ernst Sons' Iron Works, Buffalo, this week took the steel fabricating and erecting contract, about 150 tons, for the Canisins College building, Buffalo.

**Old Material.**—The same stagnant condition of the market prevails as for the past week or two, and the continuance of these conditions has brought about a further decline in prices. There is practically no market to speak of in any grade; what few transactions there are being confined entirely to small tonnages or carload lots. We have revised price schedules, as shown below, which represent the market as closely as can be determined, many of the quotations shown being nominal:

Heavy melting steel.....	\$11.50 to \$12.00
Low phosphorus steel.....	14.00 to 14.50
No. 1 railroad wrought.....	13.25 to 13.50
No. 1 railroad and machinery cast scrap.....	12.75 to 13.25
Old steel axles.....	18.00 to 18.50
Old iron axles.....	22.00 to 22.50
Old car wheels.....	12.50 to 13.00
Railroad malleable.....	11.00 to 11.50
Boiler plate.....	9.50 to 10.00
Locomotive grate bars.....	10.00 to 10.25
Pipe.....	9.00 to 9.25
Wrought iron and soft steel turnings.....	6.25 to 6.75
Clean cast borings.....	6.00 to 6.25

### The German Iron Market

BERLIN, April 20, 1911.

Hardly any change in the situation can be reported this week. From the Siegerland district it is stated that ores are being called for shipment at a somewhat slower pace. This is probably due to the heavy importations of foreign ores in March.

In the absence of any striking news from the home industry the trade is looking eagerly for developments in the foreign iron markets this week. The weakness of prices in the United States and England has attracted much attention; especially has the unfavorable news from America reacted upon German iron share prices pretty sharply. The weakness of warrant prices reported this week from England is interpreted here as being chiefly due to German influences, since Germany remains the largest consumer of English pig. The latter, however, is meeting with sharper competition from German iron, and latterly its price has been declining at points on the lower Rhine.

In the Belgian market two tendencies are apparent. While the market for rails, beams, and plates continues in a favorable position, and other finished products are also in a fairly satisfactory way, pig iron prices still lose ground. The latest prices noted are 60.50 to 61 francs for puddling iron, 62 to 63 francs for basic, 67 to 68 francs for No. 3 foundry, but even these figures are hardly more than nominal. The news from the iron district of northern France indicates that conditions there remain most satisfactory. Orders in large amounts were received throughout the March quarter, and the works are supplied for a considerable period ahead. Latterly, however, orders for pig iron have not been placed so freely as hitherto, inasmuch as consumers are trying to get reductions in prices in view of developments in other countries, but furnacemen refuse to make any price concessions whatever. Considerable railroad building is planned in the Briey region because of the rapid development of the mining and smelting industry there.

In the German trade, interest is still centered on the negotiations for prolonging and extending the Essen Pig Iron Syndicate. Another meeting with the Siegen furnacemen is to be held within a few days, but it is quite uncertain what the outcome will be. The Siegerland furnaces are partly operated in connection with steel plants, and these occupy such a strong position as consumers of their own iron that they will certainly not enter the syndicate except upon the most favorable terms; in other words, they will demand very large allotments. Furnaces not run in connection with steel mills, however, would be glad to make terms with the Essen organization, and they will apparently accept even very moderate allotments. These latter furnaces are having a pretty hard time to hold their own in competition with the furnaces of the steel makers, inasmuch as both ores and coke are dearer than last year.

The Deutsch-Luxemburg Company, which only last year absorbed the Dortmunder Union Company and made a big addition to its capital in carrying out the deal, is now about to annex the Rümelingen-St. Ingbert Hochofen und Stahlwerk, another important concern. Apparently the operation will not be an amalgamation, but rather a long lease. The annexed company has an allotment of 182,000 tons in the German Steel Works Union and is very profitable, the dividend for the business year ending with this month being estimated at between 15 and 18 per cent.



# THE IRON AND METAL MARKETS

## New York

NEW YORK, May 3, 1911.

**Pig Iron.**—The market has gone on so long on substantially the present price basis that buyers are not as keen in the hunt for concessions, and, with less variation in quotations made them, are rather concerned about getting irons best suited to their wants. A certain amount of new inquiry is coming to the furnaces, but without signs of the sort of buying that came in February and early March. One sale of 5000 tons of foundry iron was made through a local office in the past week, but the ordinary run of business was in lots under 500 tons. The reduction in ores seems to be no factor in the situation except as it may cause some holding off; it has not affected the price of pig iron. Jobbing foundries are hardly as busy as in March, and they, as well as foundries connected with machine shops, are melting less iron because of the machinists' strike. Shipments from furnaces have been little affected so far. The inquiry for several thousand tons for air brake work is still pending, and further buying is expected from a sanitary pipe interest. We quote on iron at tidewater as follows: Northern No. 1 foundry, \$15.75 to \$16; No. 2 X, \$15.25 to \$15.50; No. 2 plain, \$15 to \$15.25; Southern No. 1 foundry, \$15.50 to \$15.75; No. 2, \$15.25.

**Finished Iron and Steel.**—The volume of business in this market continues fair, and there is little change in general conditions. The rumored weakness in bars reported from the West has not made its appearance in the East. Business in plates promises to be affected adversely here and there by a widespread local strike of machinists. In structural lines, some standing contracts have been closed; some large ones are still outstanding, but little of a large order has developed in the New York territory. The New York City Bridge Department is expected shortly to advertise for perhaps 3000 tons for reinforcement of the Williamsburg bridge; the tonnage involved in the Woolworth building, New York, will probably aggregate 20,000 to 25,000; the 4000 to 5000 tons of the Walker street building of the New York Telephone Company are still to be placed; the 6000-ton Bamberger department store letting has been postponed, and no announcement is yet forthcoming on the 80,000 tons of the Interborough system extensions, New York. The Atlantic Coast line has inquiries for material largely to replace wooden trestles and likely to aggregate before the end of a year a total of 5000 tons. The Chicago & Northwestern Railroad is reported to be in the market for 8000 tons for bridges; and figures for bridges have been asked by the Great Northern and the Pere Marquette, and 500 tons by the Pittsburgh, Shawmut & Northern. F. H. Harris, Jr., has the general contract for a 400-ton highway bridge at Rutherford, N. J. Of recent closures may be mentioned the following: Baltimore & Ohio, 1600 tons, Wheeling, W. Va., to American Bridge Company; loft for Fabian Construction Company, 1700 tons, to A. E. Norton Company; loft of Stone Construction Company, West Thirty-fifth street, 650 tons to Ravitch Brothers (the last two with Bethlehem shapes); the Haviland loft building, East Thirty-sixth street, 1400 tons, to American Bridge Company; Continental Fire Insurance Building, 8000 tons, part Bethlehem shapes, to Milliken Brothers; loft for Franklin Simon, 400 tons, to Hay Foundry & Iron Works; building for Crystal Spring Water Company, 200 tons, to Levering & Garrigues Company, and bridge for Erie Railroad, to Lewis F. Shoemaker & Co.

**Cast Iron Pipe.**—Buying continues extremely light, neither public nor private buyers manifesting much interest in the market. The only public letting of even moderate importance in this locality is that of Perth Amboy, N. J., involving 350 tons of 24-in. water pipe, which includes some flexible pipe, on which bids will be opened to-day. Prices show practically no indication of strengthening, carload lots of 6-in. being held at about \$21 to \$22 per net ton, tidewater.

**Steel Rails.**—The Maryland Steel Company has taken an order for 14,000 tons of rails for the Florida East Coast, and one of 12,000 tons for the Seaboard Air Line. The Rock Island has closed at Chicago for 8000 tons for early delivery to its St. Paul & Des Moines. The United States Steel Products Company has sold 3500 tons to the Guatemala Central. These will be rolled at the Edgar Thomson works. The Tennessee Company has sold 1000 tons to the Nashville, Chattanooga & St. Louis, and at Chicago 1250 tons has been sold to the Duluth, South Shore & Atlantic. A 1500-ton order for open hearth ferrotitanium rails for an Eastern line will be rolled at Pittsburgh.

**Ferroalloys.**—The market for ferromanganese is very quiet and rather weak. Dealers are quoting about \$36.50 for ferromanganese at seaboard. Inquiries for ferrosilicon are somewhat better, but only small lots are wanted. New York dealers are asking from \$53 to \$54, Pittsburgh.

**Old Material.**—The general condition of trade continues as unsatisfactory as at any time within the last few weeks. Dealers are steadily having trouble with rejections. A few transactions are reported among which is the purchase of 1000 tons of heavy melting steel scrap by a nearby consumer. Some sales have been made of rolling mill stock and cast scrap, but those making such sales have only been able to do so by the most energetic application. It is noteworthy that cast borings and wrought turnings are not over-plentiful, indicating that machine shops have not been fully employed of late, and they are likely to be in still shorter supply in this immediate locality as the result of the machine shop strike inaugurated on Monday. Some quotations last week appear to have been too low, as the prices thus given represented sacrifice sales and hardly represented the true condition of the market. This applies particularly to wrought scrap. Dealers' quotations are as follows, per gross ton, New York and vicinity:

Old girder and T rails for melting	\$10.00 to \$10.50
Heavy melting steel scrap	10.00 to 10.50
Relaying rails	20.00 to 21.00
Standard hammered iron car axles	21.00 to 21.50
Old steel car axles	15.50 to 16.00
No. 1 railroad wrought	13.00 to 13.50
Wrought iron track scrap	12.00 to 12.50
No. 1 yard wrought, long	11.00 to 11.50
No. 1 yard wrought, short	10.00 to 10.50
Light iron	5.00 to 5.50
Cast borings	5.00 to 5.50
Wrought turnings	5.50 to 6.00
Wrought pipe	10.00 to 10.50
Old car wheels	11.50 to 12.00
No. 1 heavy cast, broken up	11.50 to 12.00
Store plate	9.00 to 9.25
Locomotive grate bars	9.00 to 9.50
Malleable cast	10.00 to 10.50

The Jones & Laughlin Steel Company announces the removal on May 1 of its New York sales department, H. F. Holloway, manager, from the St. Paul Building, 220 Broadway, to the City Investing Building, 165 Broadway.

## Metal Market

NEW YORK, May 3, 1911.

### THE WEEK'S PRICES

Cents Per Pound for Early Delivery.

Copper, New York.		Tin.		Lead.		Spelter.	
April.	Lake.	Electro-lytic.	New York.	New York.	St. Louis.	New York.	St. Louis.
27....	12.37	12.12½	41.70	4.42½	4.27½	5.50	5.30
28....	12.37	12.12½	42.30	4.42½	4.27½	5.50	5.30
29....	12.35	12.12½	....	4.42½	4.27½	5.50	5.30
May.							
1....	12.30	12.10	42.60	4.42½	4.27½	5.50	5.30
2....	12.30	12.10	42.25	4.42½	4.27½	5.50	5.30
3....	12.30	12.10	42.00	4.42½	4.27½	5.50	5.30

The copper market has quieted down, and new inquiries are scarce. Tin is very dull, and to-day was down to 42c. Lead continues weak. Inquiries for spelter are better, but few sales have been made.

**Copper.**—The copper market is in striking contrast to what it was a week ago. Last Thursday and Friday there was a fair amount of buying, but after that inquiries fell off, and to-day the market is almost stagnant. Some sellers have been readjusting their prices from day to day, lowering their quotations a few points at a time, and at present lake copper can be had at 12.30c., while electrolytic is freely quoted at 12.10c. Regardless of the fact that large amounts of copper were bought at five to ten points above these figures ten days ago, consumers are at present taking no interest in the situation. The London market was dull this morning, with spot copper offered at £54 1s. 3d., and futures at £54 13s. 9d. The exports of copper for the first three days in May amounted to but 20 tons, although it is expected that later in the month the movement will be heavier, as it is known that considerable copper was sold for foreign account during the recent activity.

**Pig Tin.**—Little interest is being taken in tin, and the first three days this week were the duller experienced in the tin trade in a long time. Even the dealers do not appear to be interested in the situation, as, notwithstanding the fact that plenty of tin is offered at below the import parity, they refuse to buy for stock. It is probable that a feeling of pessimism has been caused somewhat by the reports of small deliveries into consumption in this country for April. According to figures given out by the Metal Exchange, only 3300 tons was delivered into consumption, but this was not so surprising as that deliveries in March were very heavy. This morning tin was offered in New York at 42c., which is ½c. lower than it was a week ago. In London this morning the market opened with spot tin quoted at £193, and futures at £195 5s. The market was very weak.

**Tin Plates.**—The demand for tin plates is only fairly good, and stocks in the large dealers' hands seem to be ac-

# THE IRON AND METAL MARKETS

accumulating. The New York price is unchanged at \$3.94 for 100-lb. coke plates.

**Lead.**—The lead market is weak and neglected. Prices have not changed, but some New York outside dealers show a decided anxiety to sell, and there are indications that they would be willing to make concessions. Inquiries are so scarce that quotations are largely nominal. The St. Louis market is reported to be better in tone than the New York, and the price there is 4.27½c., while independent dealers here are offering lead at 4.42½c. The American Smelting & Refining Company continues to hold its price firm at 4.50c.

**Spelter.**—Although there are reports of better inquiries for spelter, no sales of any consequence have been recorded. Those desiring to buy do not seem to be satisfied with the quotations made by sellers who are holding the market fairly firm. The New York price of spelter is 5.50c., and 5.30c. is being asked in St. Louis.

**Antimony.**—Quotations on Chinese and Hungarian grades of antimony have stiffened as the result of the report that the European syndicate has secured control of some of the more important brands produced in China and Hungary. Cookson's antimony is very strong, as it does not seem to be so plentiful as other grades. Hallett's is offered at 9c., and Chinese and Hungarian grades at from 8.20c. up. Earlier in the week Hungarian antimony was offered at about 8.10c. There is still plenty of antimony offered at resale at lower prices than those demanded by the regular importers.

**Old Metals.**—The market is weak. Dealers' selling quotations are as follows:

	Cents.
Copper, heavy cut and crucible.....	11.75 to 12.00
Copper, heavy and wire.....	11.25 to 11.50
Copper, light and bottoms.....	10.50 to 10.75
Brass, heavy.....	7.75 to 8.00
Brass, light.....	6.50 to 6.75
Heavy machine composition.....	10.25 to 10.50
Composition turnings.....	8.50 to 8.75
Clean brass turnings.....	7.75 to 8.00
Lead, heavy.....	4.20 to 4.25
Lead, tea.....	3.95 to 4.00
Zinc scrap.....	4.25 to 4.30

**Metals, St. Louis, May 1.**—Lead is quiet but firm at 4.30c.; spelter is dull but steady at 5.30c. to 5.32½c., both at East St. Louis. Zinc ore is firmer, the Mexican war cutting off Mexican exports of ore and stimulating the demand for domestic; quoted at \$36 to \$39 per ton, Joplin base. Tin is steady at 42.55c.; antimony (Cookson's), 9.80c.; lake copper, 12.72½c.; electrolytic, 12.17½c., all at St. Louis. The market for finished metals is quiet.

## Notes on Prices

**Rope.**—The demand for cordage continues somewhat below normal, and orders are usually for comparatively small quantities. There is considerable diversity in prices of hard fiber rope, owing to the numerous grades of raw material used by different manufacturers. Some manufacturers who for years have kept the product that bears their brand up to a standard quality will, if necessary, it is thought, meet competition by lowering the standard. The following quotations represent regular prices to the retail trade in the Eastern market for rope 7-16 in. in diameter and larger, with card advances for smaller sizes: Pure manila of the highest grade, 8½c. to 9c. per pound; second grade manila, 7½c. to 8c. per pound; hardware grade, 7c. to 7½c. per pound; pure sisal of the highest grade, 6½c. per pound; second grade, 6c. per pound; rove jute rope, ¼-in. and up, No. 1, 6½c. to 7c. per pound; No. 2, 6c. to 6½c. per pound.

**Linseed Oil.**—Large consumers are doing very little buying. Carloads are held on the basis of raw at 88c. to 89c. per gallon. Some of the foreign oil which has been found to be adulterated is said to have contained rape seed oil, the seed having been mixed with flax seed before crushing, to improve the quality of the oil cake, which does not injure the linseed oil for soap making. There is a large demand abroad for linseed oil when it is the cheapest grease soap makers can buy, but the price of linseed oil is now too high to permit of its use for this purpose. Rape seed oil damages linseed oil to a certain extent for use in painting. The following are New York prices in 5-barrel lots or more:

	Cents.
State, raw.....	92
City, raw.....	91
Oil in lots of less than 5 bbl., 1 cent advance per gallon.	
Bolled oil, 1 cent advance per gallon over raw.	

**White Lead in Oil.**—During the larger portion of April, white lead in oil was but moderately active, but toward the end of the month an improvement was noted. New York quotations are as follows: Lots of 500 lb. and over, 7½c. in 100, 250 and 500 lb. kegs; 7½c. in 25 and 50

lb. kegs. In lots of less than 500 lb. the usual advance of ½c. is charged.

**Naval Stores.**—The turpentine market ruled quiet and steady for the greater part of the period under review. Latterly, however, increased activity has been observed. Prices show a slight decline, as the new crop is coming in more freely at Southern points, causing stocks to accumulate. New York turpentine quotations in 5-barrel lots are as follows:

In oil barrels.....	Cents.
In machine barrels.....	78
Less than 5-bbl. lots, ½ cent advance per gallon.	78½

The rosin market is slightly lower in sympathy with Savannah. On the basis of 280 lb. to the barrel, common to good strained is quoted at \$7.75 and grade D at \$8 in the New York market.

## Iron and Industrial Stocks

NEW YORK, May 3, 1911.

For no apparent reason stock prices advanced the past week, just as they had declined the previous week. In some securities the advance made was quite important. It may be possible that interests connected with speculative movements have been able to discern signs of improvement which are denied to the general public. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Allis-Chalm., com.....	7½	Pressed St., pref..	100 - 101
Allis-Chalm., pref..	27½ - 28½	Railway Spr., com.	31½ - 33
Beth. Steel, com.....	31½ - 33½	Republic, com....	32 - 32½
Beth. Steel, pref..	61 - 62	Republic, pref.....	92½ - 95½
Can, com.....	9½ - 11	Sloss, com.....	49 - 49½
Can, pref.....	83½ - 86½	Sloss, pref.....	112
Car & Fdry, com..	51 - 53½	Pipe, com.....	15½ - 16
Car & Fdry, pref..	114 - 115	Pipe, pref.....	54
Steel Foundries... 43½ - 45*		U. S. Steel, com..	73½ - 76½
Colorado Fuel....	29½ - 30	U. S. Steel, pref..	118½ - 120½
General Electric..	152 - 159	Westinghouse Elec.	66½ - 70
Gr. N. ore cert....	59½ - 61½	Va. I. C. & C.....	59 - 60½
Int. Harv., com..	117½ - 120	Am. Ship, com....	70 - 70½
Int. Harv., pref..	124	Chl. Pneu. Tool....	48 - 50½
Int. Pump, com..	38½ - 40½	Cambria Steel....	45½ - 46½
Int. Pump, pref..	87½ - 88	Lake Sup. Corp....	28½ - 28½
Locomotive, com..	36 - 38	Pa. Steel, pref.....	104½
Locomotive, pref..	104½ - 107	Crucible St., com..	12½ - 14½
Nat. En. & St., com....	17	Crucible St., pref..	77½ - 83½
Pressed St., com..	32 - 33		

\* Ex dividend.

**Dividends.**—The Pressed Steel Car Company has declared the regular quarterly dividend of 1¼ per cent. on its preferred stock, payable May 24.

The American Radiator Company has declared the regular quarterly dividends of 1¼ per cent. on the preferred and 2 per cent. on the common stock. The preferred dividend is payable May 15, and the common June 30.

The Inland Steel Company has declared the regular quarterly dividend of 1¼ per cent., payable June 1.

The Steel Company of Canada reports as follows for the six months ended December 31, 1910:

Profits from operations, less repairs and maintenance..	\$783,664
Depreciation and renewals.....	104,071
Balance.....	\$679,593
Interest on Steel Company bonds.....	190,500
Interest on Montreal Rolling Mill bonds.....	15,000
Interest on mortgage.....	805
Surplus.....	\$473,288
Preferred dividends.....	227,370
Net surplus.....	\$245,918

## Chicago

FISHER BUILDING, May 3, 1911.—(By Telegraph.)

A slight improvement is noted in the sale of structural shapes, and rumors of price concessions on fabricated materials are less insistent. Although no very large tonnage has been placed by railroads, business has been better than last week in standard section rails, and Western lines are evidently about to close orders for cars. Iron bars have been weak and the lower prices which are now being named are still reported to be shaded. The Indiana Steel Company's new universal plate mill at Gary, Ind., has been given a most satisfactory trial and will soon be in operation. The demand for wire products, which has been extremely good through the entire year, is dropping off. General business conditions, while improved here and there, are on the whole unsatisfactory. Practically no new business is being developed by the producers of pig iron, and foundry stocks, which under ordinary conditions would be considered normal, are looked upon as large. There is no disposition on the part of purchasers of any commodity to anticipate wants, and all industries are suffering accordingly.



**Pig Iron.**—Stagnation pretty well describes the Chicago pig iron market. No new inquiries of note have made their appearance, and some of the old ones have been withdrawn. Buyers have somewhat taken the attitude of sellers, inasmuch as most inquiries are in the form of offers. Southern iron, which is being offered by sellers through the balance of the year on the basis of \$11, Birmingham for No. 2 foundry, is calling forth inquiry offers of \$10.75 and \$10.50, but so far as can be learned no such offers have been accepted by Southern furnacemen. The recent reduction in the price of Northern ore and in navigation charges is being used freely as a wedge to pry concessions, but both Northern and Southern furnaces have well maintained prices. Numerous foundries are requiring that shipments on contract be delayed, which indicates strongly that business is not coming up to their expectations and that pig iron stocks in foundry yards are large. A manufacturer of gasoline engines in the Chicago district is in the market for 1000 tons of No. 2 Southern. Other inquiries are small. Most business closed by furnaces the past week has been with old customers renewing contracts. Rumor is apparently the only active feature of the market. The following quotations are for Chicago delivery, with the exception of Northern irons, which are now quoted, f.o.b. furnace:

Lake Superior charcoal.....	\$17.50
Northern coke foundry, No. 1.....	15.50
Northern coke foundry, No. 2.....	15.00
Northern coke foundry, No. 3.....	14.75
Northern Scotch, No. 1.....	16.00
Southern coke, No. 1 foundry and No. 1 soft....	15.85
Southern coke, No. 2 foundry and No. 2 soft....	15.35
Southern coke, No. 3.....	15.10
Southern coke, No. 4.....	14.85
Southern gray forge.....	14.60
Southern mottled.....	14.60
Malleable Bessemer.....	15.00
Standard Bessemer.....	17.40
Basic.....	15.85
Jackson Co. and Kentucky silvery, 6%.....	17.90
Jackson Co. and Kentucky silvery, 8%.....	18.90
Jackson Co. and Kentucky silvery, 10%.....	19.90

[NOTE.—The remainder of the Chicago market report had not been received up to the time of going to press.]

### A New Charcoal Blast Furnace

A charcoal blast furnace is to be erected at Wells, Delta County, Mich., by Charles Schaffer of Marquette, an iron maker of many years' experience. At Wells is located the Mashek Iron & Chemical Works, in which Senator Isaac Stephenson is a leading stockholder. This company produces charcoal and the various by-products resulting from its manufacture. Mr. Schaffer has contracted with the Mashek Company for a 20 years' supply of charcoal, and will soon begin the erection of his furnace. It will have a capacity of 100 tons daily. The Mashek Company will enlarge its operations by the construction of additional kilns.

Both the Manistique and Newberry, Mich., furnaces of the Lake Superior Iron & Chemical Company continue out of blast. A large stock of charcoal iron is in storage in the yards. The chemical plant at Manistique is to be rebuilt and thoroughly modernized, as is now being done at Newberry.

**An Air Cooling System for Sheet and Tin Plate Mills.**—For some time the United States Steel Corporation has considered plans for installing a cooling system in each of the hot mill departments of the plants of the American Sheet & Tin Plate Company. At the Finance Committee meeting on Tuesday of this week the appropriation was passed and work will be started at once, so that workmen in all these mills in the coming summer will have the benefit of this arrangement for introducing cooled air.

The Maryland Steel Company, Sparrows Point, Md., has been awarded a contract to construct two self-propelled oil barges for the Navy Department. Each of the barges is to have a cargo capacity of 153,400 gal. The boats will be 165 ft. 9 in. over all, 25 ft. beam and will have a hold 11 ft. 1 in. deep. The motive power will be furnished by compound marine engines. A feature of the construction is that the vessels will be propelled by furnaces fed with oil instead of coal. Steam steering gears and electric lights will also be a part of their equipment.

### The International Harvester Company

In presenting the annual report of the International Harvester Company for the year ended December 31, 1910, showing total sales of \$101,166,359, profits for the year of \$8,684,819, and a profit and loss surplus of \$16,069,549, President Cyrus H. McCormick remarks as follows:

The success of this company depends primarily upon the prosperity of the farmers throughout the world. The foreign trade in harvesting machinery, and the sales of the recently developed new lines at home and abroad, now constitute two-thirds of the company's total business, and contribute more than proportionately to the net earnings. The extension of the company's business throughout the world has established it upon a firmer basis and insures greatly stability and security from crop failures.

The rapid growth of the business has required large capital outlay for increased manufacturing facilities and country warehouse capacity, as outlined in the statement of property account. To meet the increasing demand with prompt and adequate service to customers, new warehouses, with a storage capacity of 2000 carloads, have been erected in the United States and Canada.

The manufacture and sale of harvesting machinery probably require a larger working capital in proportion to the volume of sales than any other commercial enterprise, because of the long credits extended to farmers and the necessarily large investment in inventories and manufacturing facilities. At December 31, 1910, the total assets of the company aggregated \$195,000,000, while the total sales of manufactured products for the year were less than half that amount.

The high tariffs on harvesting machinery in Europe and the necessity for better and prompter service to our customers have required the construction of works at Croix, France; Neuss, Germany; Lubertzy, Russia, and Norrköping, Sweden. The French and German factories were completed during 1910, and are now in satisfactory operation. Additions to the Russian plant, costing nearly \$1,250,000, are now being made for building lobogreikas, mowers and reapers in 1911; and a twine mill is building at Neuss.

The properties producing raw materials have been in successful operation during the year and supply a large proportion of the company's requirements. Increased facilities have been added to the blast furnace and steel mill property at South Chicago. Extensive development work is in progress on the company's coal lands in Kentucky, and a coking plant of 300 bee-hive coke ovens is being constructed. A new sawmill at Huttig, Ark., with a daily capacity of 80,000 ft. of hardwood lumber, was completed during the year.

Better and increased crops can be produced by more scientific methods of agriculture and intensive farming. The company is endeavoring to supplement the able and efficient work of the Department of Agriculture and the various State experimental stations and agricultural colleges by publishing pamphlets dealing with scientific farming. The company is financing three experimental farms in different sections of the country and is offering premiums in other districts to promote the raising of the finest crops.

A profit-sharing distribution was again made in 1910 to meritorious employees, in which 1976 participated. The plan of interesting employees as stockholders on a employees are now stockholders.

Realizing the objections to the usual method of handling industrial accidents in the United States, the company in April, 1910, inaugurated an industrial accident plan providing liberal compensation for industrial accidents to be paid regardless of legal liability on the part of the company. Although it is not compulsory upon any employee to accept settlement for accidents under this plan, in the great majority of cases the amount is accepted and personal injury litigation is avoided. The plan requires a reserve fund to meet liabilities as they occur, and this year the company has appropriated \$250,000 for this purpose.

## Advantages of Worm Drive for Automobiles

BY WARREN NOBLE, ST. LOUIS, MO.\*

Worm or screw gearing is among the oldest mechanical movements and until recent years has been employed to obtain either a great mechanical advantage or a considerable reduction in speed between related machine parts. Later developments introduced it as a driving gear for higher speed mechanisms, and its users began to see greater possibilities than was at first expected. Worm drive for automobile purposes is counted by many as a new development, while, as a matter of fact, its use commenced with one of the earliest really successful automobiles built in Great Britain. The maker of this developed a special form of worm gear which he has employed continuously since 1897, and the mechanical success achieved with the worm gear led to other companies following the example, until to-day a very high percentage of the British cars, both commercial and pleasure, are worm driven, while reports from Europe indicate that the French and Germans are following in the lead as quickly as they can acquire the necessary experience. In America the same thing obtains and the merits of the worm drive have led to broad spread experimental investigation, and it is an open secret that not only are very many American firms about to announce worm driven models in the near future, but that certain of the truck manufacturers are already converted to its use.

Those unacquainted with modern worm driven mechanism will immediately call to mind a single-threaded irreversible worm. In place of the old single, double, triple or even quadruple thread worms which the practice of the past has rendered familiar, worms of peculiar tooth formation with seven, eight or even as many as fifteen threads or teeth, cut on them with very high spiral angles and perfectly reversible are employed. It is in the multiplication of the number of threads, or rather in the spiral angle employed, that the fundamental difference between the older form of worm gearing and the modern high efficiency type of the present day is found. The efficiency rises very rapidly until a 35-degree value for the speed angle is reached, and from there to 45 degrees the curve of efficiency is almost flat. The average efficiency is approximately 90 to 91 per cent, when the gear is new and may reach as high as 94.6 per cent, after continued use. This rise of efficiency on the part of worm gearing as its life proceeds is noteworthy. Every turn of a gearing properly mounted and suitably lubricated simply increases the degree of polish of both worm and wheel surfaces, causing them to approach more nearly the truly smooth condition demanded. This is borne out in practice and in pleasure automobile construction it is no uncommon thing to find an axle that shows no signs of wear in the gears after having run over 50,000 miles in hard service. The importance of this difference between worm gearing and other forms should not be overlooked, since with bevel and spur gears the commencement of wear is but the beginning of the end and instead of improving with life such gears steadily depreciate.

There are two types of worm in use, the double throated, or hour-glass, type, and the straight type, in which the wheel alone is throated. Advocates of the double throated type claim that the land, or bearing surface, of the worm with the wheel is considerably greater than with the straight type, and were it possible to pursue similar methods of manufacture in both cases, there might be some advantage from this quality alone. Practice, however, steps in and by vastly increasing the difficulties of very accurate cutting discounts the claimed advantage in the majority of cases and leaves the straight worm in the position of equal or superior advantage to the opposed type, since its threads may not only be more accurately formed initially, but may be finished and brought to an exceedingly high state of polish by a special grinding process.

The straight type is capable of more accurate produc-

tion at less cost than the other type, and, although certain European makers are successfully cutting and using the concave pattern the advantage of greater land surface is of little value in truck gears where the diameter of the worm gear is almost invariably large, and in which the lands extend in any case for at least two or three teeth. In worm gearing perfection of manufacture is most important, and the perfection of such manufacture has been a matter of extreme difficulty on the part of the English engineers who have engaged in it. The success or failure of a gearing depends chiefly upon the processes employed in its generation, and the utmost secrecy with regard to these processes is maintained by the firms engaged in its manufacture.

The silence of worm gear is indisputable. It demands less intricate mounting, involves no hardening risks, provides an exceedingly wide range of gear ratio without change of parts, has an exceptionally long life, is independent of subsequent adjustment and is as cheap to construct as the present bevel gear. Its efficiency under ideal conditions is at least equal to the most accurately cut and delicately adjusted bevel gearing, while its commercial efficiency is infinitely higher. There is a total lack of the short period vibration invariably set up with bevel gear, with the result that not only is the final drive silent, but the sound of the transmission devices between the final drive and the engine are themselves mitigated.

## Economy Tests of a Turbine-Driven Furnace Blower

In the power plant of the Boston Woven Hose & Rubber Company, Cambridgeport, Mass., steam turbine driven blowers, made by the Exeter Machine Works, Exeter, N. H., have been installed, with a reduction in coal consumption of about 11 per cent. Before the installation of the blowers 378 tons of coal were burned per week, costing \$1512. After the blower installation the coal consumption was 336 tons, costing \$1344, which is equivalent to a saving of \$168 per week, or \$8736 per year. Exhaust gases from the furnace contained 14 per cent. of carbon dioxide.

In an evaporation test on one of the boilers fitted with one of these blowers, reported by J. C. Long, chief engineer of the Boston Woven Hose & Rubber Company, the coal used was a mixture of half anthracite wharf screenings and half New River coal. The water evaporated per pound of coal as fired was 8.64 lb. The equivalent evaporation from and at 212 degrees F. was 10.35 lb. The cost of the fuel used in evaporating 1000 lb. of water from and at 212 degrees was 14.6 cents. The reduction of coal cost due to the turbine blowers is \$27.60 per day. The boiler tested was a 72 in. x 18 ft. horizontal return tubular boiler, with 1614 sq. ft. of heating surface and 36 sq. ft. of grate surface. The forced draft pressure was  $1\frac{1}{2}$  in. The blower on this boiler has been operated at as low as 30 lb. pressure, and at this pressure the blower made 605 rev. per min.

Advantages of using the Exeter turbine blower are the saving in coal, the reduction of the amount of cinders and smoke, the increase in the capacity and the ability to burn cheaper fuel. The blower is small and space can easily be found for it. It is recommended that it be placed against the side of the boiler and connected with a small steam pipe for the supply and arranged to discharge under the grate. A damper may be placed on the discharge to regulate the supply and deflect it to the ash pit floor so that the distribution is uniform. With or without such a damper a pressure regulator can be applied on the steam supply which will take care of the turbine operation automatically so that it requires no attention, or a damper regulator can be used and a connection made to a lever valve in the supply pipe. When the turbine cannot be placed in the position suggested it may be located in the rear or on top of the boiler or on a bracket on the wall or anywhere that is handiest for piping the air to deliver under the fire.

\* Noble & Prewitt, consulting engineers.



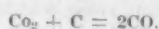
## Essential Factors in the Formation of Producer Gas

Under the above title, bulletin No. 7 has just been issued by the Bureau of Mines, Washington, D. C. The authors, J. K. Clement, L. H. Adams and C. N. Haskins, detail an investigation of the chemical and physical processes that take place in the gas producer, in which they kept in view not only the possibility of increasing the efficiency of the producer as a source of energy and the ensuing benefits to the public of cheaper power and greater utilization of low grade fuels, but also the application of the results to the problems of boiler-furnace operations.

In experiments made by one of the authors at the bureau's experiment station, it was found that the temperature in the fuel bed of the gas producer varied greatly in different parts of the bed. To ascertain the conditions of temperature most favorable to the efficient operation of the producer it became necessary to determine the temperature required for the formation of carbon monoxide and hydrogen. Among other reasons for investigating the conditions for the reduction of carbon dioxide by carbon was that a small quantity of carbon monoxide is invariably contained in the flue gases of boiler furnaces, and it was hoped that means might be suggested of preventing its formation and the resulting loss in furnace efficiency.

These investigations demonstrated that a very high temperature is necessary for the production of carbon monoxide from carbon dioxide and carbon. There are conditions, however, which argue against operating the fuel bed and the gas producer at extremely high temperatures—above 1,300 C. A very hot fuel bed means that the gases will leave the producer at a high temperature, and thus lower the efficiency of the producer. The gain in capacity would, therefore, be accompanied by a loss in efficiency, unless the heat of the gases could be used for generating steam or preheating the air blast. A high temperature also favors clinkering. In the application of the results of these experiments to commercial producers and furnaces it will be necessary, of course, to consider the other questions which are involved.

Various explanations have been suggested to account for the presence of small amounts of carbon monoxide in the flue gases of boiler furnaces. Perhaps the one generally accepted by engineers is that the oxygen of the air first unites with carbon to form carbon dioxide, and that as this gas passes up through the bed it combines with carbon in accordance with the equation:



Assuming this to be the correct explanation, then the questions to be solved are what conditions favor this reaction and what conditions will tend to retard it. It has been shown by the authors that the higher the velocity of the gas and the thinner the fuel bed the less will be the percentage of carbon monoxide formed. A heavy fuel bed in the boiler furnace would therefore favor the formation of carbon monoxide; also the greater the supply of air to a given depth of bed the less would be the percentage of this gas formed; therefore with a hot fuel bed the formation of a small amount of carbon monoxide is inevitable. In order that this carbon monoxide may be burned to carbon dioxide in some way, sufficient air must be added to the hot gases as they leave the top of the fuel bed.

### Temperatures for Water Gas Generation

The bulletin also contains a chapter by J. K. Clement and L. H. Adams on "Effective Temperatures for Water-Gas Generation." The results presented show that a high rate of gasification combined with a high percentage of carbon monoxide and a low percentage of carbon dioxide and water requires a high temperature in the fuel bed. The higher the temperature the better will be the quality of the gas and the greater the capacity of the producer. The use of large amounts of steam is inconsistent with the realization of high temperature, and is, therefore, to be avoided.

Although these investigations were undertaken primarily to determine the conditions governing the formation of producer gas, the results have an important bearing on the water-gas process. They show that, although with very low rates of steam supply the decomposition of the steam may be complete at 1100 degrees C., with higher rates of steam supply, such as are desirable in practice, a much higher temperature, 1300 to 1400 degrees C., is required to obtain complete decomposition. The highest efficiency will be obtained by raising the temperature of the bed during the blast as high as is possible without injury to the producer. As the bed cools during the run with steam, the steam should be gradually reduced, and when the temperature has dropped to 1000 degrees C., the steam should be cut off.

The bulletin is of a scientific character and will be of interest to engineers engaged in gas producer and gas engine work. Copies may be obtained by addressing the Director of the Bureau of Mines, Washington, D. C.

**The Turin International Exposition.**—At Turin, on April 30, the International Exposition of Industries and Labor, the biggest affair of the kind ever attempted in Italy, was opened auspiciously. There is a friendly rivalry between Turin and Rome, where the Art Exposition, the other great feature of the jubilee celebration of Italian unity, is in full swing, and intense popular interest in both undertakings has been a result. The Turin Exposition occupies 12,000,000 sq. ft., extending on either side of the River Po, the two parts being joined by four bridges, two built especially for this occasion. The American pavilion comprises the largest exhibit ever made abroad by our Government. In all there are 15,000 exhibitors, representing many countries, Francis B. Loomis is commissioner general from the United States and Albert H. Michelson, American consul at Turin, is deputy commissioner.

**Ensley Rail Mill Closed Down.**—The steel plant of the Tennessee Coal, Iron & Railroad Company at Ensley, Ala., closed down Saturday night, April 29, with the statement that lack of orders necessitates a shutdown temporarily. The finished product is steel rails exclusively. The company has orders for June rolling.

A number of changes have recently been made in the management of the Superior Axle & Forge Company, Buffalo, N. Y. The company this year started its new plant on Elmwood avenue and the New York Central Railroad Belt Line, Buffalo, and is now engaged in the manufacture of axles for automobiles and heavy drop forgings, eye beams, &c., for automobile and motor truck work. C. B. Kane, having resigned the position of general manager, H. G. Slining has been made manager of the works, and J. H. O. Bunge business manager. Mr. Slining was formerly superintendent of the Struthers-Wells Company, Warren, Pa., and Mr. Bunge was formerly connected with the Snow Steam Pump Works, Buffalo.

The Denver Rock Drill & Machinery Company, Denver, Colo., has established a branch at 500 and 502 San Francisco street, El Paso, Texas, comprising an office and wareroom. The El Paso branch will be known as the Rock Drill & Machinery Company.

The Newport News Shipbuilding & Dry Dock Company has been awarded a Government contract for the building of two revenue cutters at a total cost of \$476,000.

The Tuscaloosa Furnace of the Central Iron & Coal Company, at Holt, Ala., blew out April 30 for repairs, with no definite date fixed for resumption.

The Pope Tin Plate Company has removed its New York office from 29 Broadway to 50 Church street, room 1877. H. M. Easton is manager of this office.

## Unemployment Insurance in Great Britain

The London *Economist* thus treats of this important subject, which is now agitating England:

When all is done, there must always remain a considerable amount of unemployment to which no remedy is applicable, and which can only be tided over by insurance. Both parties of the House of Commons are now agreed that this principle should be applied, the electors at the last election having been given to understand that the matter would be dealt with in this way. It only remains, therefore, to consider how it should be applied, and what difficulties have to be met in framing a scheme of universal insurance against unemployment.

In the first place, there is a preliminary question of principle to be decided. Should every trade bear its own risks, or are we to take the point of view that in trades of a fluctuating nature—the general public being held responsible for these fluctuations—the risk should be borne by the whole nation? At first sight the latter theory seems a plausible one, and it was rumored a week or so ago that Lloyd George meditated adopting this plan. But the only compulsory scheme of unemployment insurance which has ever existed in Europe, namely, that at St. Gall, in Switzerland, was wrecked largely on this very point. Employees in trades having steady employment were made to contribute to the insurance of workmen, such as those in the building trade, who are certain to be unemployed during some part of the year. Unless one has a very efficient system of administration, workers and employers in steady trades will use every possible device to escape paying a premium of which they will never reap the benefit; if they are represented on bodies whose duty it is to distribute the unemployment benefit, they will adopt a niggardly policy with the idea of saving their own pocket. But this method is objectionable also on grounds of equity. After all, the risky trades in general get back from the public a sufficient premium to cover their fluctuations in the shape of high prices. The risk is already paid for, though the high profits and wages of fat years may not often be set aside for lean years. There is scarcely room for any doubt whatsoever that organization by trades with premiums determined according to the risk run is essential if the scheme is to be a success. In this respect the Board of Trade's plan, which was put before the House of Commons two years ago by Winston Churchill, seems to be on the right lines.

But the greatest of all the problems connected with unemployment insurance is to find means of preventing malingering. We have said that this form of insurance is different from any other social insurance. The distinction lies in the fact that while the question whether a man is old, sick or infirm is determined by conditions over which, as a rule, he has no control, and can be certified by an independent witness, the same man may easily be and remain out of work for no other reason than that he is insured. The moment insurance is guaranteed the motive to find work is slightly altered. No actuary can estimate the necessary premium in such a case. The two years during which St. Gall's scheme was in existence the membership fell off from 4200 to 3035, while the premiums decreased from £867 to £636 in the second year. Nevertheless, the benefits paid rose from £890 to £1535. In St. Gall there was no doubt faulty administration, contributions were inadequate, and no proper control was kept over the payment of benefits, but the history of this scheme indicates that the difficulty is a serious one.

Successful unemployment insurance in this country turns upon efficient administration. Assuming that the Board of Trade scheme is the one ultimately adopted, the malingeringer will be kept out, in the first place, by the work test offered by the labor exchanges—a test which can only be made effective if the employers of this country lend their whole hearted support to the labor exchanges movement. A man will be offered work if a vacancy is known to the exchange; if he refuses to accept it, his insurance money will cease. The test is, however, not

nearly so simple as it looks, and some pretty problems will have to be faced in applying it. What work must a man be bound to do? What wages must he accept? Must he be willing to take work in a non-union shop if he is a member of a union? Must he accept work offered to him during a trade dispute? These questions are certain to cause friction. It is to be hoped that they are not so fundamental as to wreck the scheme. Another device for confining the scheme to genuine workers temporarily out of work is by limiting the payment of benefit to a period of 20 weeks only. If a man continues unemployed for 20 weeks and he is still unemployed he drops out of the scheme, and if afterward he obtains employment he must re-enter the system afresh. On the second occasion the workman must subscribe longer before he becomes eligible for benefit. The original period of probation is eight months; the second period (for those who have dropped out) will be extended, and the third will be more lengthy still. This has the effect of saving the fund. All those who are habitually unemployed, the frequently out-of-work, must then seek relief from the distress committees or the poor law, and are outside the scope of the unemployment insurance system.

Another difficulty arises when we attempt to count the cost. Various actuaries were asked by the royal commission on the poor law to estimate the premiums required to insure a laborer aged 21 against unemployment until 65 years of age, providing for (a) payments of 10s. a week, (b) one-half usual wages for a period of 12 weeks—the answer to distinguish suitable groups of occupations and various rates of wages. One gentleman answered: "At the present time I am not aware of any adequate data for answering the question submitted to me by the commission." Mr. Ackland ventured the suggestion that "if an average rate, for instance, of unemployment of 5 per cent. per annum is taken, and it is further assumed that the unemployment benefit is on the average 10s. weekly for three weeks, or say £1 10s. in all, it may, very roughly, be considered that an annual payment of about 1s. 6d. would, on the average, provide for such assumed benefit at such assumed rate. I should wish it to be understood, however, that the royal commission could not, in my opinion, place any reliance on such figures or deductions." George King made an estimate in more detail, ranging from 4d. per week to 11½d. per week, according to the trade considered. But in view of such hesitating opinions and the unknown factors which may quite possibly be introduced by the scheme itself. It must be admitted that from a financial point of view the politicians are proposing to take a leap in the dark. The cost of the scheme proposed by Mr. Churchill was given as £1,500,000 a year to the Imperial Government, while the premiums were to work out at some £250 per year from an employer employing, say, 500 men, in addition to the worker's contribution of 2½d. a week. But in the result the exchequer may well find itself burdened with a much larger sum, while some employers may have to pay very much larger premiums than that suggested.

The position, then, amounts to this: The House of Commons is pledged to produce an insurance scheme which may be expected to cost several millions. The public, knowing little of the intricacies of the problem, are anxious for the experiment to be tried, and are willing to find funds if only there is a guarantee that the money will be well spent. On the other hand, a false step might do incalculable harm if the stimulus to find work is weakened. The scheme as a whole stands or falls on the capacity of officials to administer it without either becoming partisans in trade disputes, or encouraging indolent workers at the expense of the industries with which they are nominally connected. If these difficulties can be satisfactorily overcome, not only will the trade of the country be rid of a grave incubus, but a potent cause of social unrest will be disposed of, while the spending power of the working classes—being spread more evenly over good and bad times—will in itself tend to prevent fluctuations in industry in so far as they are due to variations in home trade.



## Personal

Henry R. Cobleigh, for the past seven years mechanical editor of *The Iron Age*, has accepted the position of publicity manager for the International Steam Pump Company, 115 Broadway, New York. His associates wish him the large success to which his industry, ability and high character entitle him.

W. W. Macon, who has been editor of *The Metal Worker*, one of the David Williams Company publications, for the past six years, has been appointed one of the editors of *The Iron Age*, and will give special attention to the engineering department.

A. H. Tuechter, president of the Cincinnati Bickford Tool Company, Cincinnati, Ohio, will leave New York May 17 for a European tour, expecting to be absent about four months.

H. B. Gaylord, Scranton, Pa., has been appointed district manager for the Taylor Iron & Steel Company, High Bridge, N. J., succeeding R. D. Van Valkenburgh.

H. P. Shaw, formerly sales agent of the American Steel Foundries, is now connected with the Hubbard Steel Foundry Company, East Chicago, Ind., as sales manager, with offices at No. 417 Fisher Building, Chicago.

Frank C. Lewis, Western manager for the Colonial Steel Company since it was established, and James S. Lewis, also with the same company, have resigned their positions to accept similar ones in the tool steel department of the Charles G. Stevens Company, Monroe and Jefferson streets, Chicago. Mr. Lewis will act as manager of the department, and Mr. Lewis will assist him.

C. W. Lytle, formerly superintendent of the Sharon, Pa., plant of the American Steel Foundries, has been made general manager of the Hubbard Steel Foundry Company, East Chicago, Ind.

W. T. Hays was made general superintendent of the plant of the Scullin-Gallagher Iron & Steel Company, St. Louis, Mo., April 24, succeeding F. G. Dunbar, resigned.

A. A. Aranson, for a number of years one of the buyers at the Chicago office of the International Harvester Company, has been transferred to the management of the company's Canadian purchasing department, with headquarters at Hamilton, Ont. C. R. McDonald will succeed Mr. Aranson in the Chicago office.

W. H. Shephard, a director of T. Inman & Co., Ltd., steel manufacturers of Sheffield, England, who has been visiting the trade in this country, sailed May 3 for England.

Maurice Goedman, 32 Broadway, New York, has taken the agency for a number of foreign made high speed and motor car steels, including the Excelsior Austinite steels, and all of the lines formerly handled by the Royal Metal Steel Company, which is now out of existence.

Geo. G. Crawford, president of the Tennessee Coal, Iron & Railroad Company, returned this week from a European trip.

Charles M. Schwab sails for Europe this week. He will attend the international conference of steel manufacturers at Brussels in July before his return.

Frederick Hughes, for the past six years chief engineer for the Driggs-Seabury Ordnance Corporation, Sharon, Pa., has joined the engineering staff of the New Departure Mfg. Company, Bristol, Conn., manufacturer of ball bearings.

C. C. Hayward, formerly Cincinnati manager of the Whitney-Kemmerer Company, whose Western office was recently discontinued, has joined the sales force of the Jones & Laughlin Steel Company, and will have headquarters in Cincinnati.

The Eastern Steel Company, Pottsville, Pa., has appointed Edward C. Phelps as its Cincinnati sales agent, and offices have been opened in the Fourth National Bank Building.

George W. Whitehead, for several years night superintendent at the plant of the Lackawanna Steel Company, Buffalo, N. Y., has been appointed metallurgist for

the company in place of Dr. G. B. Waterhouse, who will hereafter devote his time to research and experimental work for the company.

George F. Alderdice, who has been manager of sales for the Republic Iron & Steel Company, at St. Louis, has been appointed assistant general manager of sales, effective May 1. He will be located at Pittsburgh. Paul W. Cotton, formerly connected with the Cleveland sales offices of the company, succeeds Mr. Alderdice in charge of the St. Louis office.

Daniel J. Hauer, Park Row Building, New York City, will hereafter devote his time entirely to consulting engineering and the introduction of methods of system and economy in contracting.

Effective May 1, E. Sidney Lewis, formerly salesman for the Standard Steel Works Company, Philadelphia, assumed the position of special sales agent of the Pittsburgh Steel Company, with headquarters in Pittsburgh, to perform such duties as may be assigned to him by the general manager of sales.

## Obituary

THOMAS BRESLIN, Waterford, N. Y., died April 12. He had been associated with J. M. King & Co., Inc., manufacturers of dies and die stocks, for more than 60 years, and since the incorporation of the firm as president and treasurer.

WILLIAM H. PAXTON, treasurer of the Canonsburg Steel & Iron Works, died at his home in Canonsburg, Pa., April 27, aged 65 years. He was also president of the First National Bank of Canonsburg. He was not married.

LEWIS F. GRAMMES, Allentown, Pa., died April 26, aged 67 years. He was an inventor of machinery, having much mechanical skill and aptitude, and his firm, L. F. Grammes & Son, conducted a large export trade.

JAMES J. CARRY, a pioneer railroad builder and the founder of the Waugh Steel Works, died at his home in Chicago April 26, aged 65 years. He leaves a widow and three sons.

JAMES P. WETHERILL, Chester, Pa., who was associated with his brother, Isaac Wetherill, in the machine business under the name of the Wetherill Brothers Machine Company, died May 1, aged 40 years. He leaves a widow and one child.

J. E. JOHNSON, manager of the Longdale Iron Company, Longdale, Va., died April 30. His son, J. E. Johnson, Jr., is manager of the Lake Superior Iron & Chemical Company, Ashland, Wis.

The Murray Iron Works Company, Burlington, Iowa, is completing an extensive addition to its shops in the shape of a steel frame building, 120 x 140 ft., having a large traveling crane down the middle and smaller cranes on the sides. This will enable the company to increase greatly its production of water tube, tubular and fire-box boilers.

The three Thomas, Ala., furnaces of the Republic Iron & Steel Company made a record for this plant in April, with an output of 24,398 tons, an average of 813 tons a day, or 271 tons per furnace. While larger outputs have been made per furnace, this is the highest daily average for an entire month with all three furnaces in operation.

At the Krupp works in Essen the 50-ton steam hammer Fritz, in use for 50 years, is being demolished, and new forging presses will take its place. It was built in 1861, Alfred Krupp deciding to make the outlay of 600,000 thalers, though many engineers advised that such a hammer was impracticable.

The Cooke Works of the American Locomotive Company, at Paterson, N. J., has been closed down because of a lack of orders, according to a telegram of April 29, and 150 men are laid off. The Rogers Works is still in operation.

# Securing Foreign Government Contracts

## European Methods of Pursuing Central and South American and Eastern Business

BY LIONEL SAMUEL, NEW YORK.

Much is being written about export trade with South America and the East. These articles usually ask why the United States does not get its share and point out how it should get it. Very little—at any rate, little of value—is said about business with the governments of these countries. This is vastly more important, especially at this time. There is no doubt that, because of economic and political reasons, many contracts from Central and South America and the East, which are now going to Europe, should come to the United States. The general European trade has been assisted largely because of relations created through contracts with these governments; contracts which have been secured by persistent and systematic work of what may be termed a most scientific nature.

### Patience and Tenacity Required

The leading concerns in Europe, after deciding to enter these fields, have not hesitated to work at them with patience and tenacity until they have succeeded in gaining a strong foothold. They have always applied the efforts of the very ablest men they could secure, not ablest as experts in any special line, but men who can be relied upon, through great experience, to have the necessary tact to handle the Government officials with whom they may come in touch—as diplomats more than commercial men—attaching to them when the proper time arrives assistants with the necessary expert knowledge.

The wisest of these houses secure the services of high class men, experienced in, and with a knowledge of, how to meet the ways of these countries, particularly the ways of dealing with high officials—the main thing being to get on an equal social footing and become ingratiated with the ministers or officials who have the final word in such contracts, as well as with the lower officials who have to take care of the details. This takes time, and concerns that cannot see far enough ahead to be willing to await developments with patience cannot anticipate a successful issue in any such enterprise.

Once confidence is secured, it is permanent and lasting. In most cases it can be demonstrated that, in certain lines of construction, contracts have been repeatedly given to the company, which did the first work, even at higher prices than new competitors, because these governments prefer to continue with the concerns that they have come to know and trust. Many important houses in England owe their success largely to work they have done for South American and Eastern governments. From time to time they send men fully equipped on what may be termed exploring expeditions, to find out what is doing, and who is doing it, and what the prospects are for future contracts. They are men who travel with apparently no mission but to enjoy themselves, but who are quietly ingratiating themselves with the powers and finding out what is going on.

The building of warships and the construction of harbors, dry docks, water works, irrigation works and most public works of all kinds are placed principally in the hands of foreigners by South American and Asiatic governments.

### Time Required to Develop Relations

It is useless to expect to secure important contracts with governments as expeditiously as with individuals or corporations. Even in Western countries, those who have had experience well know the time and persistency that such dealings necessitate. With South American and Asiatic governments even more patience is necessary. They move slower. Time is not so valuable. They take longer to consider things. They do not comprehend them so well. They have to become better acquainted with whom they are dealing and get to like them and trust them. In fact, their sympathy has to be conquered as a first step, and with the friendship and confidence obtained business can be secured on more advantageous conditions than proposed and submitted by those

who have not the faculty or fortune to become "personas gratas."

Business in South America and the East almost entirely results from the "simpatia" (good feeling) that the representative can inspire in the officials with whom he is treating. Only on rare occasions, if ever, can a beginner at this class of negotiation be successful. Their successful handling is the result of many years spent in such countries and in close touch with the people so as to have a thorough knowledge of their language and natures; at least in South America. In the East a knowledge of the language is not so essential.

As a general thing, even if officials in these countries be well versed technically and theoretically in the subject of such contracts, they have had no experience in commercial dealings, and as a result of their ignorance of the practical end of it, they are naturally suspicious of everything that is put before them. And they are also very sensitive. It does no good, but great harm, to point out to these officials, even if such be the case, that they are wrong and do not know what they are talking about. If the proper diplomatic methods are employed, they can be enabled themselves to discover where they are wrong, and, while they will not own up to it, they will quickly see the point and take advantage of the information they have gained, and appreciate very substantially their having been put on the right track without having had their sensitiveness in any way wounded.

### Bribes No Longer Effective

It is still currently believed that, to a large extent, the successful negotiations with these governments depend upon the value of the bribes that in one form or another can be offered. It can confidently be asserted that such is no longer the fact. There may be still, as in all countries, spots where "grafting" can be used. But it can be taken for granted that where such grafting is accepted it is entirely thrown away, as those who take it have little to do with the final awarding of the business.

Twenty-five years ago, when revolutions were the order of the day and most of these governments were insolvent, bribery was a heavy consideration—first, because the men in power did not know how long they would be in power; and were looking after themselves, and, second, because, as the financial risk was great, exorbitant figures had to be obtained to cover them and bribery was often used to get such propositions accepted by the ministers, the congress and the president.

At the present day, however, the administration of the governments are in the hands of honest men, and these governments are financially sound, and apart from the red tape which has to be gone through in doing business with them (but not more than with any other government) may be looked upon as desirable clients from every point of view. In fact, for many reasons they are more desirable than many of the so-called "highly civilized" governments to do business with.

Doubtless many who have had dealings with departments of the United States have had bitter experience in questions of adjusting differences; the time it takes, the red tape, the difficulty and often impossibility of finding anyone who is the real person from whom a definite decision can be obtained, the shifting of the responsibility by one official on to another, and, finally, the exhaustion of patience and willingness to settle any how, so as to get it done with, often ending with neither profit nor honor. In South America and the East such conditions do not have to be encountered. It rarely, if ever, happens that the real head cannot be reached at once, and, unless there is some good reason for the contrary, it is not difficult to get an equitable adjustment of differences.

### Experience Needed in the Home Office

It is essential to have at the home office in charge of such business a man who has had as much practical



experience in such negotiations as the man who is sent away. A man of this kind will be able to judge of the capability of the one who will be sent after such business by ascertaining his knowledge of such countries, his experience in handling these people and negotiations. A man may appear to one who has had no experience in these countries as perfectly apt for the mission, whereas one who knows and has experienced the different conditions to be encountered may decide to the contrary, and with very good reasons, which may not be apparent to the inexperienced. Many conditions present themselves in such dealings which are different from those incidental to similar enterprises in Western countries.

In the course of negotiations questions may arise which will necessitate consultations between the man on the spot and the man at home; questions that demand very quick resolutions and replies; questions caused by conditions obtaining at the other end, which, while presenting no difficulties to one who knows the ground, may appear onerous to one who does not.

A case can be cited of a concession having been granted by one of neighboring republics for the installation and operation of an underground telephone system in the capitol, where an overhead system already existed. The concessionaire offered the business to a very large company in this country, which, after looking at it from every side, but without real knowledge of the situation, and without sending to examine it on the spot, rejected the proposition. The concessionaire then offered it to one of the largest electrical engineering and manufacturing concerns in Europe, which had had previous experience in such dealings. The European company immediately secured an option on the concession, and sent its most reliable representative with experts to investigate on the spot. After investigating, they took over the concession with modifications and constructed and operated the telephone line, afterward forming a company to take it over at a very handsome profit.

As a result of their enterprise, in spite of the existing overhead company, which threatened to annihilate them, the parties referred to have since secured profitable contracts of a similar nature from other municipalities and corporations, their reputation having been firmly established, by the way, in which they entered into and carried out the first contract they obtained. It can safely be affirmed that they are now so strongly established in that country that it is scarcely probable that any competitor could make much way.

Another case is recalled of a firm of European contractors which some years ago was called in by a country on this continent to help it out on a drainage contract that had been undertaken by local contractors who proved incompetent to act up in any way to their undertaking. This firm never would have been called in, however, had it not been that it already had on the spot a gentleman, representing it, who had been there some time, looking around, a finished diplomat, and whose reason for being there nobody knew before. This European concern, while quite reputable and able, had not reached very best prominence. It sent out the best talent it could secure to take hold of the work, and also, above all, the highest class men obtainable to treat with the authorities, while at home it had in charge men who had gained great experience in such negotiations. Many difficulties presented themselves from time to time, which could not be foreseen, necessitating modifications of specifications, estimates, &c., increases in figures and prolongations of time for completion. The diplomats (if the word may be used) were always successful in the negotiations for modification, and the practical men were able to give a good account of themselves in their departments. This contract was not so very large, but since its completion the firm has enjoyed contracts in that country for over \$75,000,000, and it is doubtful if any competitors could get anything there, and its success in handling its affairs there led to its having obtained successfully large contracts in adjacent countries.

Foreign contracts are as of much interest to manufacturers of machinery of all kinds as to contractors. It is impossible for a contractor to construct any works without needing machinery and supplies, and it natural-

ly follows that orders for all this material, with very few exceptions, go to the country of the contractor. Skilled labor is also equally of interest, as naturally this will invariably come from the same center as the contractor. And so it is that the result of these contracts is beneficially and permanently felt by all industries in the country whose natives secure this class of business. The tools, machinery, &c., become known by the men in the countries to which they are taken and give further business from private sources.

### The Essex-Merrimac Chain Bridge

The *Cornell Civil Engineer*, published by the Association of Civil Engineers of Cornell University, Ithaca, N. Y., presents in its April issue a most interesting article by A. P. Mills, assistant professor of materials, giving a history of the Essex-Merrimac chain suspension bridge at Newburyport, Mass. This is a bridge which was thrown open to the public in November, 1810, and in the late summer of 1909 was finally closed to travel on the assumption that it had become unsafe after a century of continuous use.

The bridge consisted of a single arch of 240-ft. span, which was originally constructed with 10 chains and had a total width of 15 ft. The whole weight of the flooring, chains, suspenders, &c., was about 100 tons, and the total cost was \$25,000. It was built on the principle invented by James Finley of Fayette County, Pa., and patented by him in 1808. Quite a number of chain bridges were built on the Finley pattern in other parts of the country about the same time.

The suspension chains for the Essex-Merrimac bridge were forged on the spot, and the old smithy in which the work was done is still standing, though for many years it has served as a dwelling house. In February, 1827, the bridge gave way by the fracture of five of the 10 chains, while a heavily loaded wagon drawn by six oxen and two horses was crossing. The accident was attributed to the united effect of the weight of an immense body of snow lying on the bridge, and the severe weather which had contracted the particles of iron. Repairs were effected at a cost of about \$4000, and thereafter the bridge met with no further disaster. In 1891 heavy electric cars began to pass over the bridge regularly, but in three years thereafter it was found desirable to strengthen the structure, and this was done by the John A. Roebling's Sons Company. The site of this bridge is now occupied by a wire cable suspension bridge.

Professor Mills gives a great deal of information regarding the construction of bridges of this character, and enters exhaustively into a report of tests of the links used in the chains of this particular bridge, which were made by the Cornell students in regular laboratory classes. The iron used in the links is stated to have been Norway or Swedish iron. An analysis by Dr. G. E. F. Lundell of the department of chemistry, Cornell University, shows the following contents:

Per cent.	Per cent.
Graphitic carbon.....0.100	Copper.....0.850
Combined carbon.....0.000	Nickel.....0.040
Silicon.....0.015	Tellurium.....Trace
Sulphur.....0.007	Sing.....0.220
Manganese.....0.006	Iron (by difference).....99.207
Phosphorus.....0.055	

By far the most interesting, and it is believed the most significant, discovery revealed by the analysis was the existence of the high contents of copper in the iron. The bridge appears never to have been painted, and the iron work was not much corroded even where the unprotected anchor chains were 10 ft. deep in loose earth. The freedom from corrosion is stated to have been largely due to the presence of the copper and not merely to the purity of the iron, though Professor Mills says: "It is well known that pure iron is much less corrosive than impure iron." He states that the crystalline fracture often observed in the tests is primarily due to the presence of the copper, probably in greater amounts in the iron showing the most pronounced crystalline fracture. The most badly corroded links invariably revealed a fibrous structure, while those which revealed a coarsely crystalline fracture were most remarkably free from corrosion.

## The Brooklyn Engineers' Club's Exhibition

From April 18 to 22 there was held at the clubhouse of the Brooklyn Engineers' Club, 117 Remsen street, Brooklyn, N. Y., an exhibition of engineering materials, processes and models that at once became so popular that instead of closing the affair on Friday night, as had been the original intention, it was decided to keep open the following Saturday night. There was each evening a continuous stream of visitors, including engineers from every branch of the profession from all parts of the metropolitan district. In addition to these there were specialists among constructors, contractors, builders and owners of large manufacturing as well as residential plants. Each exhibit was presided over by an expert of its own, and 10-minute talks were given, some a trifle longer when necessary, to fully demonstrate what the inventor or manufacturer had to show. There were two unusual features of this show, one being the fact that the admission was free to the public, and the other that there was no expense to the exhibitor.

Space will not permit a detailed description of each exhibit, but attention may be specially called to the photographic exhibit of the construction work accomplished, by months, along the line of the new Fourth Avenue Subway. Here was also shown, in mosaic work, the color schemes and arrangements of the walls and tilings of the various proposed stations along the line. As the subway question is now uppermost in the minds of all Brooklynites, as well as others in the Greater City of New York, a large map, 4 x 5 ft., was shown, depicting the proposed extensions of rapid transit that would give to the citizens of the different boroughs of the metropolis 90 miles of rapid transit, of which 23 miles would be subway and 67 miles elevated, without extra fare.

Another feature attracting considerable attention was a model dry dock, shown in a specially constructed tank on the stage of the large auditorium of the clubhouse. In this tank of water was the dry dock, and in the dock a full rigged ship. The mechanism was so arranged that the dock would fill and sink, leaving the ship floating gracefully; and then the water would be pumped out and the dock would rise again entirely dry. William T. Donnelly is the designer of the dry dock. That the show might have a realistic touch, the Nelson Goodyear Company caused to be moved into the clubhouse, which is situated on one of the fashionable residential streets of the city, a 1-ton portable oxyacetylene apparatus, with its tanks containing oxygen at a pressure of 1800 lb. to the square inch. Here a welding torch welded the seams of a steel pressure tank, and a cutting torch slid through an 1-in. slab of iron until the sparks flew about in gorgeous pyrotechnic display. "There is no reason why a steeple should be more pious than a smokestack," was the motto of the M. W. Kellogg Company, which had an exhibit showing, among other things, its chimney blocks, and it gave out many of its little model bricks as souvenirs.

This is the first exhibition of its kind ever held by an engineers' club in New York, and great credit reflects upon the members of the Brooklyn Club for their very successful endeavor to advertise Brooklyn, their profession and their club. The committee in charge of the exhibit consisted of C. A. Somner, Wm. T. Donnelly, John S. Simmons, Donato Cuozzo, Henry A. Sinclair, George Welderman and Wm. J. Grinden.

The following is a complete list of the features shown and the names of the demonstrators:

Wood paving, U. S. Wood Preserving Company.  
Continuous rail joints, Rail Joint Company.  
Digging machinery, Hayward Company.  
Refuse destruction, Heenan Destructor Company.  
Crushers, Gardner Crusher Company.  
Floating dry dock, William T. Donnelly.  
Cableways, Lidgerwood Company.  
Specialties, Manning, Maxwell & Moore.  
Wiring tests, H. T. Wrecks' Wire Inspection Bureau.  
Modern fire extinguisher, Pyrene Company.  
Fire alarm system, Gamewell Company.  
Fireproof furniture, Van Dorn Iron Works and General Fire Proofing Company.  
Fireproof doors, Grinden Art Metal Company.  
Not stated, Brooklyn Edison Company.

Hydraulic fittings, The Jefferson Union Company.  
Power plant equipment, M. W. Kellogg Company.  
Oxy-Acetylene Welding, Nelson Goodyear.  
Ventilating blowers, American Blower Company.  
Nash blower, National Meter Company.  
Electric drill, Chicago Pneumatic Tool Company.  
Hot air pumping machinery, Rider-Erickson Company.  
Valves, Jenkins Bros. Company.  
Belting, N. Y. Leather Belting Company and Chas. A. Schieren Company.  
Concrete construction, Turner Construction Company.  
Concrete reinforcing material, Corrugated Bar Company.  
Metal lath and reinforcing, United Exchange Metal Company.  
Concrete sewer pipe, Lock Joint Pipe Company.  
Pedestal piling, McArthur Pile & Foundation Company.  
Waterproofing, McCormick Waterproofing Portland Cement Company.

Joseph Strachan, 117 Remsen street, Brooklyn, is secretary of the club.

## Strike of New York Machinists

The International Association of Machinists declared a strike May 1 in what is known as District 15, which includes all the members of the union in New York City and Hudson County, N. J. The men were called out by the union in an attempt to force the employers to agree to an eight-hour working day. No other question appears to be involved. Manufacturers employing machinists in the territory affected by the strike have joined hands with the members of the National Metal Trades Association in combating the trouble. It is estimated that about 6000 machinists walked out on the day the strike was declared, of whom 1200 were employed by members of the National Metal Trades Association. The latter organization has opened temporary offices at 120 Liberty street, New York, which are in charge of Robert Wuest, commissioner of the association, and Frank Cheske, who is a special representative. It is declared by Commissioner Wuest that all the shops operated by members of the Metal Trades Association will be in full operation before May 15, and work was resumed in most of them before the strike was three days old. In anticipation of the strike the Executive Committee of the association, at a meeting held shortly after the annual convention in New York, adopted the following resolutions as a declaration of principle:

*Whereas*, A demand has been made on certain members of the National Metal Trades Association by labor unions for an eight hour working day; and

*Whereas*, It is our belief that the existing hours of labor in vogue by the members of the National Metal Trades Association are not excessive, viewed with reference either to the physical capacity of the workman or his social, moral and intellectual welfare; and

*Whereas*, The actual physical exertion required from the shop workman has been in the last few years greatly reduced by the general introduction of labor saving appliances in every department of the shops, and this condition is rapidly increasing; and

*Whereas*, The greater cost of manufacture due to shorter working hours and other restrictions of production is a direct and important, though often overlooked, factor in increasing the cost of living; and

*Whereas*, The movement of the labor unions for a shorter working day, restriction of output and higher wage is directly responsible for higher cost of production and consequently higher cost of living; therefore, be it

*Resolved*, That the National Metal Trades Association hereby records its absolute disapproval of any decrease in the hours now worked by the members of the National Metal Trades Association.

In addition to the new equipment to be installed by the Washington Tin Plate Company, Washington, Pa., noted on page 1025 of *The Iron Age* of April 27, it is announced that 500-hp. water tube boilers and 150-kw. generator will also be purchased. All machinery heretofore belt driven will in the future be motor driven. Bids for all the new equipment will be asked for this week by S. Diescher & Sons, Farmers' Bank Building, Pittsburgh, and contracts will shortly be placed.

The McDonnell Boiler & Iron Works, Des Moines, Iowa, which recently suffered a loss in its foundry by fire amounting to about \$4000, states that it has made necessary arrangements for repairs, and will be in operation again within a few days.



## Official Changes in the Steel Corporation

Two important appointments were made in the official list of the United States Steel Corporation last week—that of John Reis to be vice-president and that of Ward B. Perley to be assistant to President Farrell. Mr. Reis has been for several years assistant to the president, having immediate oversight of new construction work at the plants of the various subsidiaries. Mr. Perley has been for 10 years assistant to Wm. B. Dickson, whose resignation as vice-president became effective May 1.

John Reis was born in Niles, Ohio, in 1861. In the sixties his father, George C. Reis, formed at New Castle, Pa., the firm of Reis, Brown & Berger, which became one of the largest manufacturers of rolled iron in the



JOHN REIS.

United States at that time. It is a noteworthy fact that all the six sons of George C. Reis learned in its practical details some branch of the iron and steel business, and most of them attained positions of national prominence in the industry. With the equipment of a common school education, John Reis began work in the New Castle Iron Works, operated by two of his brothers under the firm name of Reis Brothers. He learned the trade of sheet and plate rolling, and at the Neshannock Furnace, also operated by Reis Brothers, acquired a knowledge of blast furnace practice.

In 1886 he was vice-president and general manager of the Gogebic Furnace Company, Iron River, Mich., manufacturer of charcoal pig iron, and two years later became manager of the Nashville Iron, Steel & Charcoal Company, with furnaces at West Nashville, Tenn. In 1889 he was with the Tennessee Coal, Iron & Railroad Company as manager of Alice Furnace, at Birmingham, Ala., and in 1891 had charge of the blast furnaces of the Watts Iron & Steel Syndicate, Ltd., Middlesboro, Ky. In 1893 Mr. Reis went with the Oliver Iron & Steel Company, at Pittsburgh, as manager of Edith Furnace. At this time Mesaba ores were coming into use, and it was first demonstrated at these works that large quantities of these fine and dusty ores could be successfully used in blast furnace operations. At Edith Furnace and at Roseana Furnace, at New Castle, of which Mr. Reis also had charge, 100 per cent. Mesaba mixtures were charged with successful results.

In 1899, on the formation of the National Steel Company, Mr. Reis was made general manager of all blast furnace operations of the company, which included 16 active furnaces and three buildings. In 1901, when the United States Steel Corporation was formed the operation of the plants of the National Steel Company was taken over by the Carnegie Steel Company, and Mr. Reis

was made general superintendent of the Shenango Valley district, which included all blast furnaces, steel works and rolling mills at New Castle and Sharon, Pa. In 1905 he was made assistant to the president of the United States Steel Corporation. As vice-president he continues in charge of construction, in addition to other duties connected with that office.

Mr. Perley's connection with the iron industry began in the early eighteen-eighties when he was employed at the blast furnace of the Franklin Iron Works Company, at Columbus, Ohio, the product of which was then a well-known brand of foundry iron. The furnace is now No. 2 of the Columbus blast furnaces of the Carnegie Steel Company. King, Gilbert & Warner, with whom Mr. Perley was identified for a number of years, bought this furnace in 1883. The firm also operated the Moxahala Furnace in the Hocking Valley, and in the eighties it acquired the Standard Nail Company's rolling mill and cut nail works at Middleport, Ohio, Mr. Perley going to Middleport as manager. There was under construction at the same time a Bessemer steel plant at Middleport, also operated by the Columbus firm. About 1892 this was removed to Columbus, and the nail works were abandoned. The King, Gilbert & Warner Company purchased about 1893 the Cherry Valley Iron Works at Leetonia, Ohio, consisting of a rolling mill, blast furnace, coke ovens and coal mines, and Mr. Perley, who was a stock-



WARD B. PERLEY.

holder and a director, was active in the management at Leetonia. On the taking over of the King, Gilbert & Warner Company by the National Steel Company in 1899 Mr. Perley went to Chicago as assistant to Riley Gilbert, vice-president in charge of the operating department. Later the general offices were removed to New York, and in 1901 when the United States Steel Corporation took over the National Steel Company Mr. Perley became assistant to Vice-President Dickson, having to do chiefly with blast furnace operations, and at times with purchases of pig iron and old material.

The Keystone Tube Works, Inc., Connellsville, Pa., maker of round and square welded agricultural, bedstead and special tubing, has purchased about 15 acres of land adjoining its present plant at Wheeler Station, a suburb of Connellsville, and bids are now being asked for additions to its present mill building, which will increase the floor space about one-third. Contracts for the addition are to be closed May 5.

The Sloss-Sheffield Steel & Iron Company, Birmingham, Ala., is operating four of its blast furnaces, the monthly output being somewhat above 25,000 tons. The pig iron stocks on hand are put at 105,000 tons.

## The Mechanical Engineers' Programme

The application of mechanical engineering to the field of cement manufacture will be one of the important questions considered by the American Society of Mechanical Engineers at its annual spring meeting, to be held in Pittsburgh, Pa., May 30 to June 2. Papers will be presented covering different phases of the subject, among them one on "Edison Roll Crushers," by W. H. Mason, superintendent of the Edison Portland Cement Company, Stewartville, N. J., and one on "Some Problems of the Cement Industry," by Walter S. Landis, associate professor of metallurgy, Lehigh University. A feature of the convention will be an excursion by special train to the plant of the Universal Portland Cement Company, Universal, Pa., on invitation of E. M. Hagar, president of the company. Other important topics will be turbo-compressors and forging presses.

In addition to papers already mentioned, the professional sessions of the convention will deal with machine shop practice, with papers on "The Assembling of Small Interchangeable Parts," by John Calder, manager Remington Typewriter Works, Ilion, N. Y.; "The Process of Assembling Small and Intricate Parts," by Halcolm Ellis, Ellis Adding-Typewriter Company, Newark, N. J.; "The Design of Milling Cutters and Their Efficiency," by A. L. De Leeuw, mechanical engineer, Cincinnati Milling Machine Company, Cincinnati, Ohio; also with steel works practice, with papers on "The Commercial Application of the Turbine Turbo-Compressor," by R. H. Rice, General Electric Company, West Lynn, Mass.; on hydraulic forging presses and blowing engines, and with miscellaneous topics, including papers on "Stresses in Tubes," by Reid T. Stewart, professor of mechanical engineering, University of Pittsburgh; "The Purchase of Coal on the Heat Unit Basis," by Dwight T. Randall, engineer in charge of the fuel engineering department of Arthur T. Little, Inc., Boston, Mass.; "Energy and Pressure Drop in Compound Steam Engines," by F. E. Cardullo, department of mechanical engineering, New Hampshire College of Agriculture and the Mechanic Arts, and "A Pressure Recording Indicator for Punching Machinery," by Gardner C. Anthony, dean of the engineering school of Tufts College. There will also be a session on gas power, with papers to be announced.

The convention will open Tuesday afternoon, May 30, with the registration and reunion of members at the headquarters in the Hotel Schenley, followed by an informal reception for members and guests on the evening of the same day. There will also be an opportunity on Tuesday and Wednesday afternoons for inspection of the Foundry & Machine Exhibition Company's exhibit, which will be in progress in the Exhibition Building. On Wednesday morning the mechanical engineering of cement manufacture will be the subject of the first of the technical sessions, all of which will be held in Carnegie Institute, in close proximity to the society's headquarters. In the afternoon a trip to the works of the Universal Portland Cement Company will be made, with a stop at East Pittsburgh to allow those who desire to visit the plants of the Westinghouse Electric & Mfg. Company and the Westinghouse Machine Company. The second technical session, at which the papers on machine shop practice will be presented, is scheduled for the evening of the same day.

The professional session of Thursday morning will deal with miscellaneous topics, and will be as brief as possible to leave ample time for an excursion up the Monongahela River, including a visit to the National Tube Company's works at McKeesport. A reception and informal dance will take place in the evening at the convention headquarters. The concluding professional session, when steel works practice will be the subject for consideration, will take place on Friday morning. An inspection trip to the Mesta Machine Company's works at Homestead, Pa., is planned for the afternoon of Friday, and the convention will close that evening with a smoker and entertainment, given by the Engineers' Society of Western Pennsylvania at its rooms in the Oliver Building. A Ladies' Committee, Mrs. Chester B. Albee,

chairman, will care for the pleasure of the guests of the society, and will, as is usual at these conventions, do much to add to the social features of the occasion.

## Customs Decisions

### Old Broken Electrotypes

In a decision adverse to the claims of Albert A. Moore, the Board of United States General Appraisers has made a ruling interpreting the tariff act of 1909 in relation to the classification of old broken electrotypes, invoiced as "old type fit only for remanufacture." The collector assessed duty at the rate of 45 per cent. under the provision for articles composed wholly or in chief value of metal. The importer's claim is that the merchandise is free of duty under paragraph 702, or alternatively as unenumerated manufactured articles at 20 per cent., or as "waste" at 10 per cent. General Appraiser Fischer states in his decision for the board that, while it may be true that these old articles are made of type metal, it is equally true that in their imported shape they are electrotypes and not type. He holds that this refuse material is, in fact, old worn stereotype plates, and such forms of old metal do not respond to the description of "type," though composed of material similar to that of type, and no doubt originally used for printing purposes. He says:

As electrotypes are not "types," it follows that such articles when old are not "old types." The court in the *Sapery* case found from the facts there presented that the electrotypes plates were composed of or made from type metal, and held that the material was dutiable as type metal. In view of these rulings, we are of the opinion that the old metal "as material" is entitled to classification as "type metal" if it consists of an alloy of lead and antimony, with percentages of other metals of varying but small amounts, in which the antimony amounts to at least 9 per cent. of the mixture. The protests make no claim, however, under paragraph 191, act of 1909, as "type metal," and there is no proof in the record to show the composition of the refuse metal here in question. It is clear that the claim under paragraph 480 cannot successfully be maintained, as paragraph 199 contains a sufficient enumeration to take these articles out of the class of nonenumerated manufactured articles. The only remaining claim, that under paragraph 479, we do not regard as applicable to the goods. There appears to be no good reason to extend the provisions for "waste" to articles made in most part of lead, since Congress has evinced an evident intention in the various provisions of the act to provide and impose a duty on lead in any and all forms. On the record in this case we feel justified in following the ruling of the board in abstract No. 14,970, though had proof been offered to show that the old metal had the necessary composition to entitle it to be called type metal we would have held paragraph 191 to be applicable. The protests are overruled, and the decision of the collector will stand.

### Machines for Making Igniters for Miners' Lamps

It has been decided by the Board of United States General Appraisers that machines used in making igniters for miners' lamps are not "printing presses" within the meaning of the tariff act of 1909. The issue was raised by W. W. Coe, who objected to the classification of the machines as manufactures of metal with duty at the rate of 45 per cent. The machines were invoiced as "printing machines," and are made of metal. These machines are used to apply a mixture of phosphorus in a semi-liquid state to a narrow cotton tape. This tape is covered with the phosphorus in the shape of small dots at intervals of  $\frac{1}{2}$  in., and is used as the igniter in miners' lamps. The protestant, while claiming duty under paragraph 197, was not specific, but General Appraiser Fischer, who writes the decision for the board, says the probable intention was to claim duty at 30 per cent. as "printing presses." The evidence presented was not satisfactory, and the protest was accordingly overruled.

### Empty Ammonia Drums

The board has refused to reduce the duty on empty ammonia drums made of iron and imported by B. N. Anderson & Co. They were assessed for duty at 30 per cent. as "cylindrical metal tanks or vessels." The claim is made that the articles are entitled to free entry as "drums used for the shipment of acids from the United States." The decision, which is adverse to the contention for exemption, says it was necessary for the importers to show that the drums were actually exported



from this country in the shipment of acids, while the identity of the articles reimported should have been established by proof.

Spinning Gears

F. B. Vandegrift & Co. succeeded in securing a reduction in the assessment made on cast iron wheels invoiced as "spinning gears" and "spinning change wheels." They were classified as "manufactures of Metal" at 45 per cent., and were alleged by the importer to be entitled to enter as "machined iron castings" with a duty of 1 cent a pound. This contention is upheld by the board.

Barbers' Hair Clippers

In overruling a claim filed by G. W. Sheldon & Co., the board holds that hair clippers used by barbers are not "scissors or shears," as those terms are used in the tariff act of 1909. They were assessed for duty at 45 per cent, as manufactured articles wholly or in chief value of metal, and are claimed to be entitled to classification as "scissors or shears" under paragraph 152 at rates lower than those assessed. General Appraiser Fischer, who writes the decision, says that the clippers in question do not answer to the terms "scissors and shears," and that a hair clipper is not "shears" as commercially known or within the ordinary acceptance of that term. Witnesses for the Government testified that the articles are not known in the cutlery trade either as scissors or shears. As the importers failed to substantiate their claim or successfully controvert the testimony of the Government witnesses, the protest is overruled.

Electric Steel Production at a German Works

An illustrated description of the electric steel plant of Le Gallais, Metz & Cie in Dommeldingen, is given in *Stahl und Eisen* of February 9, 1911. This plant is very complete and contains a blast furnace, electric furnaces, steel foundry, well equipped forge shop, machine shop and laboratories. The electric power is derived from gas engines using blast furnace gas. The open hearth furnace, which is of Wellman design, is rated at 20 tons and is used as a Talbot furnace. The hot metal contains on the average 3.5 per cent. carbon, 1.5 per cent. manganese, 0.6 per cent. silicon, 0.07 per cent. sulphur and 1.82 per cent. phosphorus. The bath is worked down to about 0.15 per cent. C., 0.25 per cent. Mn., trace of Si., 0.04 per cent. S. and 0.054 per cent. P. When an electric furnace is ready for a charge from 3½ to 4 tons of metal is poured off for further refining. The same amount of molten pig iron is then poured into the open hearth, and after this addition the average composition is 0.90 per cent. C., 0.5 per cent. Mn., 0.05 per cent. S. and 0.04 per cent. P. This is worked in the usual way with pre. mill scale and lime additions. After the first vigorous reaction, the slag, which contains most of the phosphorus, is removed and a new slag made. In about two hours the metal is ready for tapping.

The electric furnaces are all of the Röchling-Rodenhauser type. Three are of 3½ to 4 tons capacity, using single phase alternating current, and the fourth is of 1½ tons capacity and takes direct current. They are all basic furnaces, being lined with well burned dolomite thoroughly mixed with tar. The average life is from 90 to 125 heats.

When a furnace is ready for a charge, the metal is brought from the open hearth furnace and poured in. The proper slag making materials are added, and in about an hour the composition is 0.05 per cent. C., 0.10 per cent. Mn., 0.04 per cent. S., no Si., and the refining has practically eliminated the phosphorus. The slag is removed. Ferromanganese and the other alloys necessary are now added, and the desulphurizing slag prepared. The bath is now deoxidized, and apart from the removal of sulphur no further change takes place. This treatment lasts about an hour, and the sulphur averages from 0.005 to 0.01 per cent. During this time any special ferro-alloys desired may be added. The company makes castings from ½ lb. up to 10 tons weight, and also has a well

equipped forge and machine shop. The castings are divided into four classes, as follows:

Mark.	Ultimate stress, Lb. per sq. in.	Elongation, Per cent.
L. G. M. a.....	56,900 to 64,000	23
L. G. M. b.....	64,000 to 71,000	20
L. G. M. c.....	71,000 to 85,400	15 to 18
L. G. M. d.....	85,400 to 99,600	8 to 10

For the electrical industry a special grade is made of the following composition: C., 0.05 to 0.06 per cent.; Si., traces; Mn., 0.20 per cent.; P., 0.005 per cent.; S., 0.003 per cent.

The forge shop is equipped with a 500-ton press, a large steam hammer, a series of smaller hammers and different finishing hammers. Ingots up to 3 tons in weight are handled, both ordinary and special steels, and finished as rounds, squares and special shapes suitable for automobile construction. An idea of the excellent grades of steel produced may be drawn from the following tables:

Table 1.—Analysis of Various Heats.

Heat No.	Grade.	C.	Si.	Mn.	S.	P.	Cr.	Ni.	W.
1458	Very soft.....	0.04	tr.	0.24	0.006	0.007	...	...	...
1406	Soft, case hard- ending.....	0.18	0.16	0.62	0.009	0.009	...	...	...
1692	Machine and wag- on construction.....	0.45	0.20	0.62	0.011	0.008	...	...	...
1738	Same.....	0.61	0.20	0.71	0.006	0.010	...	...	...
1554	Medium tool steel.....	0.81	0.20	0.27	0.008	0.008	...	...	...
1680	Hard tool steel.....	1.05	0.18	0.24	0.010	0.009	...	...	...
1638	Very hard steel.....	1.25	0.20	0.23	0.008	0.009	...	...	...
1654	Chrome steel.....	1.03	0.17	0.23	0.009	0.007	1.35	...	...
1242	Nickel, case hardening.....	0.21	0.14	0.51	0.012	0.010	...	3.77	...
1583	Nickel steel for fabricating.....	0.33	0.20	0.36	0.009	0.010	...	3.06	...
1509	Chrome nickel, case hardening.....	0.12	0.20	0.20	0.011	0.010	0.91	3.93	...
1292	Chrome nickel for fabrication.....	0.34	0.17	0.32	0.005	0.011	1.23	3.51	...
1302	Special pen steel.....	0.57	1.53	0.44	0.004	0.011	...	...	...
1300	Special tungsten steel.....	0.55	0.50	0.21	tr.	tr.	1.00	...	0.69

Table 2.—Physical Tests of Steel in Table 1.

Heat No.	Elastic limit. Pounds.	Ultimate stress. Pounds.	Elongation, Per cent.	Reduction of area. Per cent.
1458.....	31,300	43,400	35.4	70.0
1406.....	44,100	69,400	26.5	54.6
1692.....	61,150	96,580	20.2	42.0
1738.....	70,250	114,390	15.0	35.6
1242.....	54,600	76,100	23.5	64.0
1583.....	65,130	86,760	21.9	50.0
1509.....	64,560	83,900	22.3	64.0
1292.....	104,680	123,740	13.3	48.0
1302.....	68,260	112,640	15.2	43.0

Table 3.—Results on Annealed Castings.

Heat No.	C.	Si.	Mn.	S.	P.	Ultimate stress. Pounds.	Elongation, Per cent.
585.....	0.12	0.13	0.53	0.014	0.011	51,920	22.5
368.....	0.16	0.20	0.48	0.015	0.020	58,000	23.5
704.....	0.23	0.30	0.59	0.021	0.025	66,840	24.0
705.....	0.26	0.31	0.62	0.018	0.022	68,550	20.0
707.....	0.32	0.35	0.83	0.012	0.025	79,650	20.5
734.....	0.35	0.32	0.68	0.022	0.023	85,340	15.5
816.....	0.37	0.35	0.71	0.009	0.017	95,300	15.0

G. B. W.

Owing to the increase in its business within the past year, the W. A. Ives Mfg. Company, Wallingford, Conn., manufacturer of the Mephisto auger bits, bit braces, expansive bits, tap borers, &c., has found it necessary to have its bit braces manufactured elsewhere. With this in view the company has sold the machinery, tools and fixtures for the manufacture of bit braces to the Southington Mfg. Company and has not sold its entire business, as was erroneously stated in *The Iron Age* of April 27.

The offices of the S. Keighley Metal Ceiling & Mfg. Company, manufacturer of Moore's lock joint dust proof ceilings, Phoenix fireproof windows and architectural sheet metal work, have been removed from 819-823 Locust street to rooms 910-912 Union National Bank Building, Pittsburgh, Pa. The company will still maintain a warehouse at 819 Locust street, Pittsburgh, from which all local orders will be filled from stock.

# Iron Ore Reserves Underestimated

## A Discussion of the Mineral Resources of Michigan—Conservation Through Large Consolidations

BY DWIGHT E. WOODBRIDGE.

In a paper on the exhaustible mineral resources of Michigan and their conservation, read before the Michigan Academy of Sciences a short time ago, Prof. R. C. Allen, State geologist, brought forward interesting information and made timely comments that are reviewed below:

After an extended summary of the general conservation movement, Professor Allen says that Michigan originally possessed in its enormous stores of iron, copper, salt, natural brines and mineral waters, gypsums, clays, coal and other nonmetallic substances, its broad areas of timber, &c., natural resources unsurpassed by any political division on the continent. This is undoubtedly true. No mineral producing State bears in such quantity a greater variety of mineral products. And it may be added that none has shown more lavish and neglectful disregard for the future than has Michigan. Professor Allen adds that its stores of clays, gypsum, salt and natural brines and mineral waters are practically inexhaustible, but "its once magnificent forests have practically succumbed to the lumberman and to fire, and great inroads have been made upon its matchless deposits of iron and copper."

### Michigan's Place in Copper, Iron and Coal

The exhaustible mineral resources of Michigan are its iron, coal and copper, and though these are absolutely exhaustible, the problems involved in their conservation are not so pressing and important as those affecting forests, water powers and soils. That this is true is due to the fact that the operators of copper and iron mines in particular consider natural conservation good business policy, and that it is demanded by economic laws. Natural conditions as to coal, on the contrary, rather invite than prevent waste.

Up to 1887 Michigan held first place as a producer of copper metal; then it fell to second, and has since become third, by reason of the exploitation of vast copper fields in Arizona, which has pushed both Montana and Michigan back one point. But in tonnage of ore mined Michigan still leads. And in the extent of copper ore reserves, also, Michigan probably leads the world, though its reserves are of low grade. However, the rapid increase of reserves of other districts, by reason of the discovery of vast tonnages of lean ores by the drill, may change this situation. Professor Allen says that by reason of the more rapid exhaustion of the reserves of Montana and Arizona, Michigan is destined to regain first place in copper production. If this is ever true, it will probably only be true in the distant future.

For nearly half a century, prior to 1901, Michigan held first place in the production of iron ores; but the Mesaba then brought about a change and its greatly accelerating production has since made Minnesota the first State in this regard. The Mesaba is now sending out more than two-thirds of the tonnage of Lake Superior and half the total iron ore of the United States. But, so great was the early lead of Michigan, whose production began when, in 1845, 300 lb. of iron ore were taken from the location of the Jackson mine and sent to the town of Jackson for use in a blacksmith's forge, that at the close of 1910 the State had produced almost half of the total Lake Superior output and about one-quarter of all iron mined in the United States to that date. Should these comparisons be expressed in terms of metallic iron, the proportion of the State would be still larger, on account of the generally high iron content of its ores.

In coal Michigan presents an inconsiderable proportion of the total of the United States; for its share in

1908 was but 4 per cent. of the whole, and of 29 States mining coal in that year it ranked as twenty-third in tonnage and twenty-second in the value thereof.

### Depth of Iron Ore Bodies

Professor Allen presents at length geological theories and the conditions leading to the formation of iron ore bodies, of which the following paragraph is a very brief summary and discussion:

Iron bearing formations in which ore bodies occur are sedimentary rocks of the pre-Cambrian age, composed dominantly of silica, iron bearing carbonates and a ferrous silicate. In Michigan the original iron bearing mineral is mainly siderite. These iron bearing formations are interbedded with other sedimentaries and with igneous rocks of plutonic origin, and they are cut by dykes of younger intrusive igneous rocks, notably in the Marquette and Gogebic districts. The ore bearing formations vary greatly in thickness on the different iron ore ranges of the State. On the Gogebic the entire series of the formation is of a maximum thickness of 800 ft., on the Marquette from 1000 to possibly 1500 ft., and on the Crystal Falls and Menominee from 300 to 400 ft. These are the widths of formations, as they have been folded, contorted and deformed, fractured, faulted and displaced. It is in the basins formed by these movements that the ore deposits have become located.

As to the depth to which the ore bodies of Michigan may reach Professor Allen says that speculation is hazardous. This is for the reason that deposits of ore may be expected to occur to such depths as the active circulation of oxidizing and chemically active waters can penetrate, and the depth is governed by hidden factors of uncertain nature, and that will vary greatly with the character of the original foldings and fracturings of the rocks. He refers to the Newport mine at Ironwood, which is now finding large deposits of excellent ore at 2000 ft. from surface, and says that other mines are approaching this depth.

All men conversant with the history of the Gogebic range will remember when its mines were considered bottomed on almost flat floors of rock that cut across the formation at right angles to its dip, and with a pitch universally toward the east. More than 20 years ago the end of the Gogebic was in plain sight, just ahead, because these floors were accepted as the basement under which there was no concentration of ores. But floor after floor has been since penetrated and ores found beneath, until now it would be a rash man who would prophesy just where the bottom of Gogebic mines would be found. The Soudan mines of the Vermillion range (Minnesota) are now down to 1900 ft., and are far larger at that depth than when they seemed to be approaching exhaustion on the 1200-ft. level. The Mesaba has always been considered a blanket deposit of comparatively shallow depth—200 to 300 ft. at most—but a company is now proposing to sink a shaft more than 700 ft. to reach a very large deposit that is down to that level. Professor Allen is certainly wise in classing as exceedingly hazardous speculation as to the ultimate depth of Michigan's ore deposits, and I should recommend to others who are putting themselves on record as to approximate possible reserves that they follow his caution in this respect.

### Grades of Ore Shipped

Michigan's ores are classed as hematite, though a small amount of both magnetites limonites is sometimes mined. In texture they vary from soft, granular and powdery to hard, specular and schistose. Professor Allen says: "No ores averaging less than 40 per cent. iron have been shipped from Michigan mines, and of these the total has been small, while the average grade of all shipments from the State is still between 55 and 60 per cent. metallic iron." In this connection, I may state, that the



averages of grades shipped from the various mining districts of Michigan for the past year were as follows:

Range.	Iron natural. Per cent.	Moisture. Per cent.
Marquette .....	52.00	8.30
Menominee .....	49.50	7.00
Gogebic .....	52.30	10.70

This it will be seen is a mean of about 55.5 per cent. dried, without taking into consideration the very trifling differences of totals from the three districts.

#### Great Extent of Iron Ore Reserves

Total available iron ore reserves of the United States, according to the computations of Dr. C. W. Hayes of the United States Geological Survey, and others, were estimated a year ago at 4,788,150,000 tons, and total unavailable ores at 75,116,070,000 tons, by the same authority. Of these totals Lake Superior was credited with 73 per cent. of the available and 95 per cent. of the unavailable ores. Still further to analyze these figures, Michigan was credited with 8 per cent. of the total reserve of available ores of Lake Superior and 6 per cent. of the total of the United States, with 285,000,000 tons. Of unavailable ores, Michigan was given credit for holding 38 per cent. of the reserves of Lake Superior and 36 per cent. of the total of the United States, with an aggregate of 27,160,000,000 tons. However close a guess this estimate may be, and opinions will differ very widely as to its value, Professor Allen places the reserves of Michigan at not less than one-third and possibly more than one-half, greater than estimated. He says: "In the last few years large areas of ore bearing formation have been located under deep overburden by magnetic methods, and other areas are yet to be discovered by these methods and by drilling. The ore reserves in these new found ranges will be known only when thorough development by drilling and actual mining has been done. The same remarks apply also to Minnesota and Wisconsin."

Of course this is undeniable, but I do not understand that Dr. Hayes attempted prognostication in his figures. How valueless such estimates are is evinced by discoveries made in the past year or so in southern Wisconsin on the Baraboo range, and in Minnesota on the Cuyuna, the former of which in time may have 1,000,000,000 tons of available ore, while the latter's already known reserve of now unavailable ore is probably another thousand million tons. And I am willing to go on record as saying that in northeastern Minnesota there will be found enormous quantities of ore that, at some future date, will become available. A large part of this ore will become useful, only after certain changes shall have been made in metallurgical methods.

"Three are many reasons to believe," says Professor Allen, "that high-grade ores will last much longer than the three decades estimated on the average rate of increasing production of the last four decades. Nevertheless, the exhaustion of our known high-grade ore reserves may occur within the next half century. It is certain, however, that the elimination of our reserves of low-grade ores will occur in the very remote future."

#### Conservation Through Consolidation

Professor Allen thinks the State can take no step looking toward conservation of its iron ores or copper. This is being done by the mining companies themselves. At the present time there is practically no preventable waste in the mining of iron ore. That this happy condition prevails is due to the concentration of the greater part of the iron and steel industry, including mines and reserves, transport and mills, in the hands of a few large and strong corporations.

There are many who cry out against the evils of combination monopoly. Such feeling, so far as it affects the iron mining industry, is in part the result of natural prejudice and in part of a lack of information. Combinations of small producers into large corporations has worked nothing but good in the Michigan iron ranges. It has made possible the utilization of lower grade ores by the elimination of competition on the market among the various independent mines. Low grades of one mine may now be mixed with the high grades of another and utilized, whereas under former conditions the lower grades were driven out of the market by the competition of the higher. Under necessity of producing ores salable on a competitive market, independent mines were forced into wasteful methods of mining. Workings

were conducted only to secure the choicest grades and were often left in such condition that large tonnages of valuable ores were left in the ground that can now be won only at great cost and danger to human life, and in many cases not at all. Combinations have made possible the installation of modern plants which have lowered the cost of mining and permitted ores to be broken and raised to surface from much greater depths than formerly, thus increasing our reserves. Combinations have made possible the acquisition of adequate transportation facilities, or the control of rates, thus affecting further economies. The importance of these may be realized when it is considered that nearly half the cost of a ton of Michigan iron ore delivered at Pittsburgh is in transportation charges. By combination co-ordination between all branches of the iron and steel trade has been brought about, with improvement of economic conditions on the iron ranges and steady employment of more men at better pay within improved social environments. Mines that, under a competitive system could not be worked at all are now kept in profitable steady employment. All of these things have resulted in practical conservation.

In other words, conservation has been accomplished on the Lake Superior iron ranges by consolidation. A tendency toward monopoly is the inevitable result of the operation of natural economic laws.

#### Chokio Water Works Bids

The Oscar Claussen Engineering Company, St. Paul, Minn., furnishes the following details regarding the bids opened April 26 for a water works system for Chokio, Minn.: Alternative bids were called for on (A) air compressor system, consisting of 3300 gal. reinforced concrete reservoir, about 5600 ft. of 4 and 6 in. cast iron pipe, pumping plant and accessories, including 15-hp. gasoline engine, 8 x 36 ft. compression tank, air compressor and air lift, and 25 x 40 ft. power house; (B) gravity system, consisting of 40,000-gal. steel tower and tank, about 5600 ft. of 4 and 6 in. cast iron pipe, 5-hp. gasoline engine, a deep well pumping head and 14 x 16 ft. pump house. The following bids were received:

	A.	B.
Cook Construction Company, Des Moines, Iowa..	\$9,460	\$9,993
C. W. Roland Company, Des Moines, Iowa.....	9,560	9,560
Gilbert W. Haggart, Fargo, N. D.....	10,500	10,600
J. G. Robertson, St. Paul, Minn. (contract awarded) .....	8,776	9,150
Des Moines Bridge & Iron Company, Des Moines, Iowa .....	9,690	8,895
Blackhawk Construction Company, Waterloo, Iowa—pipe line, \$4,541; steel tower and tank, \$4,896.		
Minneapolis Steel & Machinery Company, Minneapolis, Minn.—steel tower and tank, \$3,500.		
Magnee Johnston, Minneapolis, Minn.—pipe line, \$5,611.		
Chicago Bridge & Iron Company, Chicago, Ill.—steel tower and tank, \$4,025.		

**The Sterling Steel Foundry Company.**—This company, whose plant is at Braddock, Pa., has increased its capital stock from \$100,000 to \$250,000. The increase was made so that the capital would more correctly represent the actual investment in the plant. Geo. W. Smith, for nine years superintendent of the Union Steel Casting Company, Pittsburgh, has bought a controlling interest in the Sterling Steel Foundry Company. Some minor improvements will be made, but no additional equipment will be needed. George W. Smith is president; William Nease, vice-president; H. G. Smith, treasurer; M. A. Quinn, secretary. With A. N. Marvin and Nelson McVickar, they constitute the Board of Directors. The company's Pittsburgh office, formerly located in the Frick Building, has been moved to the works at Braddock.

The United Engineering & Foundry Company, Pittsburgh, has received an order from the Republic Iron & Steel Company for a 32 x 90 in. two-high plate mill to be erected at East Youngstown, Ohio, on which open hearth plates will be rolled for the latter company's tube mills; also an order from the Heppenstall Forge & Knife Company, Pittsburgh, for a second high speed hydraulic forging press, the first one ordered being of 1000 tons capacity and the second 500 tons.

The Central Tube Company, Lewis Building, Pittsburgh, with works at Economy, Pa., has increased its capital stock from \$350,000 to \$500,000.

## Death of Alexander E. Brown

Alexander E. Brown, president of the Brown Hoisting Machinery Company, Cleveland, Ohio, and pioneer in the development of machinery for handling material in bulk, particularly iron ore, died April 26 from a stroke of apoplexy which he suffered March 31. Although little hope had been entertained for his recovery the end came quite suddenly. He was first stricken with apoplexy in March, 1908, but recovered and was able to return to his office in November of that year. Last July a change for the worse occurred, and he had not visited his office since that time.

Mr. Brown was 58 years of age, having been born in Cleveland May 14, 1852. He was the son of Fayette Brown, a leading citizen of Cleveland, who was president of the Stewart Iron Company, and prominently identified with other industries. Mr. Brown attended the Cleveland public schools, and in 1869 entered the Brooklyn Polytechnic Institute, Brooklyn, N. Y., from which he graduated in 1872. After graduation he was connected for several months with the United States Geological Survey, engaged on work in the Yellowstone National Park. For the next two years he was with the Massillon Iron Bridge Company as chief engineer. From 1875 to 1878 he had an office in Cleveland as a consulting engineer, devoting his attention largely to designing, building and selling bridges. In 1878 he became connected with the engineering department of the Brush Electric Company, Cleveland, then known as the Cleveland Electric & Supply Company, and assisted in the development of the Brush arc light system and the manufacture of carbons for arc lights.

While engaged as a bridge engineer Mr. Brown took up the problem of developing machinery for the rapid and economical handling of iron ore from boats, and in 1880 organized the Brown Hoisting & Conveying Machine Company. He became vice-president and general manager of this company, his father being president. He succeeded his father in this office when the latter died in January, 1910. At first the company had its handling equipment made in other shops, not building its plant until 1886. In 1900 the name of the company was changed to its present form, and reincorporated with a capitalization of \$2,000,000.

Mr. Brown built the first cable machine for handling ore from boats in 1879. This was placed in operation on the Erie Railroad docks in Cleveland. His next step was the building in 1883 of the first bridge tramway; also for removing ore from vessels to dock piles. This, too, was erected on the Erie docks in Cleveland. The next important development by Mr. Brown in ore handling equipment was the building of the first fast plant, which was a modification of the tramway, being designed for unloading direct from the boats to cars. This plant was installed at the C. & P. docks in Cleveland in 1890. These early ore handling machines were operated by steam engines, the ore being conveyed in hand filled tubs of about 1 ton capacity. These two types of handling machinery, the bridge tramway and the fast plants as then developed, were the usual means employed for handling ore during the next 10 years. The next important im-

provement devised by Mr. Brown in machinery for handling ore was the grab bucket, which was adopted about 1900. With its advent came decided changes in the form of the handling machinery, including the development of the man trolley and the almost universal use of electricity for operating machinery of this character. In 1901 Mr. Brown also employed the man trolley for operating two-rope grab buckets.

During the years in which Mr. Brown was developing machinery for unloading iron ore from boats his ingenuity was also displayed in perfecting other handling equipment, largely for the iron and steel industry. In 1889 he brought out one of the first blast furnace hoists and top distributors, the general form of his hoist being used to-day by makers of that class of equipment. In the same year he designed and built the first cantilever crane, this being installed at the plant of the Jones & Laughlin Steel Company in Pittsburgh. In 1890 he built a coal storage plant in Buffalo for the Philadelphia & Reading Coal & Iron Company that attracted much attention among engineers. This plant covered over 5 acres

and was equipped with a traveling tramway inside for handling coal. In 1893 he developed special machinery that did remarkable work in the construction of the Chicago drainage canal. These machines, 11 in number, were of cantilever construction, reaching over the canal and carrying off excavated rock and earth, which was deposited on the spoil bank 200 ft. back from the canal face. He next developed in 1895 a car dumping apparatus for loading coal direct from cars into vessels, special attention being given to preventing breakage of coal. A number of these car dumps were placed in operation along the lake ports.

Mr. Brown was the first to apply the self-filling scoop bucket for taking ore from stock piles, building in 1895 three machines so equipped at the Duquesne plant of the Carnegie Steel Company. In the same year he developed the pig breaker in a plant built for the Iroquois Iron Company, Chicago.

The general construction of this pig breaker has since been followed. He built the first cantilever shipbuilding crane and trestle, this being erected for the Newport News Ship & Dry Dock Company in 1898. Among other work designed and erected by Mr. Brown, that attracted a great deal of attention in the engineering profession, was the building in 1905 of two wireless telegraph masts, each 450 ft. high, being the only masts ever built of that height. They were 3 ft. in diameter and were insulated against the earth to resist 100,000 volts. One mast was built at Brant Rock, Mass., and the other at Machrichanish, Scotland.

Handling machinery designed by Mr. Brown is in operation in practically every country in the world. His work was an important factor in the growth of the iron and steel industry in the United States, for the invention of machinery for the quick and economical handling of Lake Superior ore from vessels to the cars made possible the great production and low cost of iron and steel in the Pittsburgh district. As an engineer Mr. Brown ranked very high. As an inventor he displayed remarkable genius, and he possessed an analytical mind that was marvelous in its grasp of complex problems. His engineering courage was a matter of comment among his



ALEXANDER E. BROWN.



associates. When he finished designing a machine there never seemed a doubt in his mind as to its ability to do the work for which it was designed. Possessed of an artistic sense, he always bore the artistic as well as the practical in mind when designing a machine. He was possessed of a remarkable personality, made friends easily and was a charming man to meet. All his energies were devoted to his work. Had he been less engrossed in his business his friends believe that his life would have been prolonged.

Mr. Brown's wife is a daughter of the late Gen. James Barnett of Cleveland. He also leaves a son, Alexander C. Brown, who is a director of the Brown Hoisting Machinery Company and connected with the sales department, and a daughter. He also leaves a brother, Harvey H. Brown of Harvey H. Brown & Co., iron ore and pig iron dealers, Cleveland, and two sisters. He was a member of the American Society of Mechanical Engineers, the American Institute of Mining Engineers, the Civil Engineers' Club of Cleveland, the Electrical Engineers' Club, the Euclid Club, Country Club and Chamber of Commerce of Cleveland.

## The Pittsburgh Foundrymen's Association

At the monthly meeting of the Pittsburgh Foundrymen's Association, held in the Fort Pitt Hotel, Pittsburgh, on the evening of May 1, three new members were added—Cyclops Foundry Company and A. C. Daft of Pittsburgh, and Samuel C. Weeks, foundry superintendent Lorain Steel Company, Johnstown, Pa. Reports were made by the various chairmen of the committees appointed for the entertainment of the American Foundrymen's Association, whose sessions will be held in Pittsburgh, commencing May 23.

H. E. Field, chairman of the Committee of Arrangements, stated that upward of 5000 people can be taken care of, and that the registration books will be opened in the registration booth in the Exposition Building on Monday, May 22, so that members arriving in the city the day before the convention opens can register and receive their badges. It has also been arranged to hold a subscription dinner in the Fort Pitt Hotel on Friday evening, May 26. Several noted speakers have been secured, who will talk on national topics, and two or three others on matters pertaining to foundry practice.

Reports were also made by Elliot A. Kebler, chairman of the Reception Committee, and George P. Bassett, Jr., chairman of the Committee for Entertainment of Ladies. Arrangements have been made to furnish the members with tickets to witness the ball game between the Pittsburgh and Cincinnati teams, Friday afternoon, May 26.

W. A. Bole, chairman of the Plant Visitation Committee, stated that arrangements had been made for a special train to take the members to the foundry of the Westinghouse Air Brake Company, Wilmerding, Pa., where the continuous pouring system is used, and after inspection of this plant the train will take the members to the Homestead Steel Works of the Carnegie Steel Company at Homestead, Pa., and then to the plant of the Mesta Machine Company at West Homestead. It has also been arranged that on Wednesday afternoon automobiles will be furnished to take the ladies through the parks in the East End and to the Pittsburgh Country Club in the evening for dinner. On Thursday the ladies will be taken for a visit through the art galleries and to the Phipps conservatories in Schenley Park, and also to the Margaret Morrison training schools.

All reports indicate that ample arrangements have been made and the sessions promise to be instructive. Dr. Richard Moldenke, secretary, reports that a large number of papers are now in the hands of the printers, while the exhibits will be more elaborate and larger in number than ever before. Already 102 booths have been engaged in the Pittsburgh Exposition Building and some elaborate displays will be made.

Dr. Moldenke made an informal address to the Pittsburgh Foundrymen's Association on "Modern Cupola Practice," his remarks being listened to with great interest. A Nominating Committee was then appointed,

consisting of Joseph T. Speer, William Yagle and C. H. Gale, to nominate officers for the coming year, the next meeting to be held June 5. F. H. Zimmers reported that the first meeting of the Pittsburgh Foundrymen's Association was held in Pittsburgh in July, 1896, a few concerns being represented; it started with 18 members, but now has 145 in good standing, and is regarded as one of the strongest foundrymen's associations in the country.

**Pittsburgh Railway Club at the Ellwood City, Pa., Tube Plant.**—Upon invitation of the National Tube Company, about 250 members of the Pittsburgh Railway Club and 150 other guests visited on Friday, April 28, the Shelby steel tube plant of the National Tube Company, located at Ellwood City, Pa. A special train left Pittsburgh at 12.30 p.m., and refreshments were served en route. The guests were shown through every part of the works and viewed the different processes of making Shelby seamless steel tubes from the bloom to the finished product. All the steel entering into Shelby seamless steel tubes is open hearth steel, three different grades being used, one running about 0.12 carbon, the second about 0.25 carbon and the third or highest quality about 0.45 carbon. The steel is shipped from its Lorain, Ohio, works in blooms 7 in. square in section, about 6 ft. long, and weighing approximately 750 lb. each. The operations of heating, piercing, rolling, drawing, pickling and annealing, involved in the manufacture of seamless boiler tubes were all seen by the visitors and explained in detail.

## Mexican Oil Developments

TAMPICO, MEXICO, April 24, 1911.—Enormous storage facilities are being provided at Tampico and other localities of this section to properly care for the oil output of the larger operators. This output has increased heavily in the last few months, and one of the great problems which the larger oil producing interests are facing is the erection of steel tanks to afford permanent storage for the oil stocks. E. L. Doheny and associates, who have developed a very large oil production in the Juan Casiano field, 80 miles southwest of Tampico, have just issued a statement showing the extent of their operations, particularly in the matter of erecting steel storage tanks. The statement says:

"Our energies are directed largely toward the construction of steel storage. We are now building Tank No. 31 out of an order for 40, each of a capacity of 56,000 barrels. These tanks were ordered last October. Of the original order of 40, therefore, there are nine more to build. An order has also been placed for 20 more of these steel tanks, each of the same capacity as those constructed or in course of construction. These will afford a total of 3,300,000 barrels of steel storage capacity at the Tampico terminal of the Huasteca pipe line. There are also an 860,000-barrel reinforced concrete reservoir nearing completion, 200,000 barrels additional steel storage south from Tampico on the pipe line and at the end of it, and 1,175,000 barrels more at Ebanco. These items, both steel and reinforced concrete, foot up the grand total of 6,005,000 barrels.

"With such storage capacity, we shall be able to take any contract that the world can offer. These storage facilities, counting in only the pipe connections, have cost \$1,250,000. Our pipe line and pumping stations to date represent an investment of \$2,250,000. These two undertakings alone, aggregating an outlay of \$3,750,000, will give an idea of the extent of our investments in Mexico. They do not tell the whole story, either, for our railroad, its rolling stock, water pipe line system, telegraph and telephone lines, our fleet of oil barges, steamboats and tugs all stand for an additional heavy investment, which, with the others, attest our confidence in the future of the great Huasteca field."

The Governor of Massachusetts has signed what is known as the "contempt bill," providing that in injunction cases in labor disputes the defendant shall be tried by a jury instead of by a judge.

# Right Principles in Works Management

## Machine Operators Reach Their Best Efficiency When Work Is Planned for Them— Piece Rate and Premium vs. Differential and Bonus Systems

BY STERLING H. BUNNELL.\*

Inertia seems to be a property of mind as well as matter. The majority of men form habits of action and thought and continue on their lines until they are forced to change their courses. Every little while men engaged in work along regular lines are confronted by a new system or theory. At first the new idea appears absurd or chimerical. It is seen later that the novelty is only apparent, and that the new system is only a reduction to science of principles already employed, but unrecognized even by those who use them. The man of scientific methods, turning his attention to a new process or practice, perceives the underlying truths and states them concisely for ready application by other men to other problems. Put forth as a set of rules, the system appears novel, unusual and complicated; yet if studied it is found that it is merely a combination of principles and practices already used in part by successful men.

### Scientific Management Not New

All of the methods of the new "scientific management" are old and well known. There were successful managers and prosperous shops before the Taylor system. However, many of the old school managers succeeded while in the act of killing their gold producing geese. Placed in charge of fairly well equipped factories, these managers proceeded to increase the output, when brisk sales made it necessary, and to decrease costs, when other factories cut prices, by the good old method of hustling. Each day's evil was sufficient unto itself. The manager was too busy to stop to think, and drove men and machinery until his equipment wore out and his workmen were superannuated. The feature of management of this type is earnest and thoughtless attention to the daily routine. In more than one case an old and experienced superintendent has been forced out by a young and apparently inexperienced man, who worked half the number of hours and spent twice as much money on nonproductive expense. Neither the old nor the young man had any accurate knowledge of his own mental processes. The old one followed the course laid down by habit; the young man cut loose along the lines suggested by common sense. Each made mistakes, but each made mistakes of a different character.

The efficiency engineers have made a science of factory management. They have borrowed the best from the old and the new. In this way they have brought together the ideas of many successful men, and have created what seems at the first glance to be a new, expensive and complicated system of red tape. The fact is, however, that management on scientific lines expresses the maximum of common sense coupled with technical training. The "unscientific" general practice is to tell the workman what his next job is to be, and then leave him to look up and get together his material, tools and supplies. The efficiency engineer has been at work for centuries trying to educate the human race beyond this point; for the tale may be found in the scriptures of the management of a brickyard which permitted its workers to leave their jobs to find and bring the necessary straw; and efficiency men were there to protest.

### Machine Operators Not Likely to Find the Best Way

The basis of scientific management is the rule of putting trained men at the problem of finding out how best to undertake each item of factory work, and then having the selected methods taught to the workers. While this procedure may have had no justification in past years, the time has come when it is imperatively necessary. The

skillful "all-around" mechanics of former years, using the light machinery they knew so well, could determine methods of machining and maximum speeds and feeds quite as well as any available planning expert. But new tools were more easily made than new mechanics. Tools ten times as heavy as before must now be run by men of one-tenth the skill. Such tools, if they cost ten times as much to operate, should produce ten times as much work; so that lost moments become expensive. The good workman of former years could experiment a little to find out the best way. The machine runner of to-day must not be allowed to waste the time of his expensive tool, even if he had the necessary knowledge to experiment intelligently.

Nothing but mental inertia could have allowed the idea to become prevalent that the best and quickest ways of doing work could be discovered by machine runners under the stimulus of piecework prices, under any condition except accident. Managers and clerical help have been conspicuous, among those who are supposed to know how to think, in following along the same old lines instead of stopping short to evolve new and better ways. The man on the machine may, in fact, pull handles faster and keep more continuously at work if it is made worth his while to do so. He is not, however, the most competent man to study the proper forms of cutting tools, the proper ways of holding work, and the proper line between injurious overdriving of the machine, and wise forcing to its capacity so as to get the best return for the capital invested. Some men are careful and overcautious; others are impetuous and hasty; and each class furnishes good workmen. But these different kind of workmen need different handling. It pays the management to select the resourceful, ingenious man to develop new methods and to use the men who work better than they think to carry out the methods after they are planned.

### Piece Work and Premium Systems

Piece work for the purpose of increasing the customary day's work is long out of date. The system was a frank confession that the management did not know what time the work should take, and hoped some of the men might blunder onto the quickest method. It put a premium on haste and inaccuracy, and set the inspector against the foreman and the workman against both. Being set by a mere guess, the piece rate was invariably too high, as the men gradually learned some of the possibilities of the equipment. Soon men of \$3-grade of skill were producing work priced at two or three times that amount. If the rates were set as a bargain between employer and employee their maintenance made it easy for any competitor to start men at lower rates and undersell the over-priced shop. If the rates were subject to reduction, no sensible workman would again exert himself to earn more than the highest rate he thought his employer would stand.

Premium payment was a device invented by F. A. Halsey with the intention of overcoming some of the difficulties of piece work. It is interesting to recall that the system was first exploited in the early '90s, at the time when the *American Machinist*, in the interest of the American machine tool builder, was declaiming against the ridiculously heavy machine tools in vogue across the ocean, and praising the light and graceful American tools which were so easy to ship and move about! A few years afterward the same paper was illustrating American tools of weight and bulk quite outclassing those "cumbersome" European machines. The premium

\* Consulting engineer, New York.



system was directed especially at those competent mechanics of 20 years ago, who had grown up with their machinery and knew all there was to know about it. By piece work stimulation they were to be induced to study out faster ways of doing their work; but the employer would keep back part of the price of their efforts. To illustrate: If a certain job took 10 hours at the usual pace, the workman would be offered half pay for the time he might save. If he did the work in 8 hours he got 9 hours' pay. If he did it in 6 hours he got 8 hours' pay. If he did it in half the set time of 10 hours he received 7½ hours' pay, so that he received for the job only three-quarters of the price paid him for the same work done in the slow time of 10 hours. With straight piece work the workman might attempt to make all he could, as long as the employer would stand for it. With the premium system the workman automatically cut his own pay as his speed increased, and soon reached the point where the increase of pay for extra effort was unimportant.

#### The Differential Payment and Bonus Systems

Both these methods of payment, it is apparent, belong to the go-as-you-please system of management, in which no one has any positive knowledge of what can be done with the means at hand. In contrast to them are the two systems based upon actual study of the possibilities, followed by the setting of the day's tasks. It is evident that one may set tasks to be performed, and still leave unsolved the problem of how to induce the workmen to meet the conditions. Obviously there must be a sufficient inducement. This may be the desire of holding the job, as where no other working places are open to the discharged man, or the other shops are less comfortable and agreeable as to conditions. It is probable that managers willing to take the trouble to improve the personal relations between workmen and shop can realize large earnings on a little inexpensive tact, diplomacy and personal "charity" in its original and broad sense. Every shop has a few men at least, who stay on regardless of conditions, held by some personal tie. These men do not strike or make trouble; and their number could be indefinitely increased by a little of the same thing that creates public opinion outside the factory, and sells the goods produced. But for those to whom the wage offers the only inducement, reward for following the instructions which insure turning out the maximum amount of work is offered by two methods of payment. One is Frederick W. Taylor's differential piece rate system; the other, H. L. Gantt's bonus payment.

Mr. Taylor, working then in the days just before the reconstruction of the whole machine tool practice to meet the demands of the Taylor-White high-speed tool steel, desired to attract the best of the skilled mechanics. He managed it by offering an extra high piece rate to those men who could attain the output he set as standard; but paying an unsatisfactory piece rate if less than the set quantity of perfect pieces were turned out. Thus, if five pieces were the day's work, the high rate might be set at 80 cents each, and the low rate at 60 cents. The man turning out five pieces in a day would then earn \$4, while a slow man, making only four pieces, would receive only \$2.40. The effect was to drive out the slow men and attract the very best workmen in their places. Needless to say, Mr. Taylor had already developed the principle of planning the work, so that he knew positively what speed could be made with the tools and equipment furnished, and that his highest rates would give abnormally high wages only to exceptionally good workers.

The bonus system was a later development in connection with scientific planning methods. It is the simplest of all wage payment systems, and involves no calculation whatever. Its inventor, Mr. Gantt, is well known for his use of schedules of factory work, showing clearly just what pieces must be made each day and just where failure or success in performing the set tasks has occurred. This kind of scheduling is of great use in routine operations, where machines that should make a stated number of revolutions per day may lose a large proportion of their running time by inefficient attendance, or slow work in supplying material and resetting

after stops. Schedule sheets are made, showing the performance of departments, machines and workmen, and checked up each day, so that the standard of performance of each is known. To insure the co-operation of the workman, a stated bonus is paid him for each satisfactory job or day's work. Regular wages are paid as usual, but at a minimum scale, and the bonus is an extra amount for efficiency. If one stops to consider that fixed charges, salaries, &c., go on every day regardless of output, it is easy to perceive that a moderate bonus for an extra 10 per cent. or so of work done with the same machines and without a cent of extra expense for labor or fixed charges may be the most profitable expenditure anywhere about the organization.

The days of the simple hustler are already past. For years our friends, the Germans, have been teaching boys trades as well as professions, in well equipped schools under competent instructors; while we have been inventing tools and taking no thought to find men competent to run them to advantage. Under the conditions which actually exist in this country, the only hope for efficient use of the remarkably excellent equipment of our newer shops, as well as for the best use of machinery of all kinds, lies in the study of its possibilities by picked men, followed by the instruction of the semiskilled workers along the lines laid down by the planners.

#### The Cincinnati Foundry Foremen

The Cincinnati Section of the Associated Foundry Foremen held its regular monthly meeting at the Grand Hotel, Cincinnati, on the evening of April 22. All the old officers were re-elected, as follows: Herbert M. Rapp, president; F. A. Elbert, vice-president; William McIntosh, treasurer; F. J. Brunner, secretary, and James W. McIntosh, sergeant-at-arms. In addition a second vice-president was elected, William Liddell being chosen for that honor. The following standing committees, to serve through the ensuing year, were appointed by the president: Educational—E. L. Blinn, John A. Logan and James A. Murphy; Entertainment—W. McIntosh, F. C. Broerman and F. J. Brunner; Membership—John Hill, H. Schuh and C. Goehring; Auditing—William Liddell, F. C. Broerman and H. M. Roberts. The following honorary members were elected: Prof. J. J. Porter, University of Cincinnati; F. O. Clements, National Cash Register Company, Dayton, Ohio; John A. Logan, ex-president Cincinnati Foundry Foremen's Association, and Prof. John J. Scheerer, Ohio Mechanics' Institute.

The association is very much interested in the apprentice problem, and a committee of four was appointed to confer with all local and national organizations, with a view of getting all possible information on the subject, and every effort will be made toward aiding in solving this question to the satisfaction of employer and employee. A representative number of foremen are expected to attend the coming Pittsburgh foundry convention.

At a meeting of the House Committee on Labor at Washington, D. C., April 20, Samuel Gompers, president of the American Federation of Labor, and James O'Connell, president of the International Association of Machinists, attacked the scientific management methods advocated by F. W. Taylor and others. The committee had under consideration the Pepper resolution providing for an investigation of the Taylor system. "The Taylor proposition," said Mr. Gompers, "would make more money for manufacturers, and it also would kill more workmen. It is certain that a man cannot work under a 'speeding-up' system for anything like the length of time that he can under normal conditions." President O'Connell declared that the Taylor system tends to wipe out manhood and would destroy the genius of the American workman.

The William Cramp Ship & Engine Building Company, Philadelphia, Pa., launched on April 20 the torpedo destroyer Patterson. This is the fifth vessel of the type built by the company.

## Iron and Steel Exports and Imports

### March Exports Largest in Our History

The report of the Bureau of Statistics of the Department of Commerce and Labor for March shows an increase in both the exports and imports of iron and steel, as compared with February. The exports were the largest for any month in our history. The value of the exports of iron and steel and manufacturers thereof, exclusive of iron ore, was \$22,591,848 in March (against \$18,690,192 in February, while the value of similar imports was \$2,951,710 in March, against \$2,145,803 in February and \$4,079,763 in March, 1910.

The exports of commodities for which quantities are given were 215,667 gross tons in March, against 150,702 tons in February and 122,340 tons in March, 1910. The details of the exports of such commodities for March and nine months of the fiscal year ending with March, as compared with the corresponding periods of the previous year, are as follows:

Exports of Iron and Steel.

Comodities.	March.		Nine months ending March.	
	1911.	1910.	1911.	1910.
	Gross tons.	Gross tons.	Gross tons.	Gross tons.
Pig iron.....	15,189	5,944	126,602	51,346
Scrap .....	10,496	1,790	33,359	9,057
Bar iron.....	3,119	2,236	13,676	10,838
Wire rods.....	2,224	2,828	13,154	16,045
Steel bars.....	11,744	8,843	90,865	65,634
Billets, ingots and blooms .....	32,898	266	118,781	48,965
Steel rails.....	42,517	33,507	268,072	288,938
Iron sheets and plates.....	10,298	11,096	74,205	70,154
Steel sheets and plates.....	20,657	15,871	140,191	101,552
Tin and terne plates.....	5,531	1,440	16,362	8,118
Structural iron and steel .....	16,374	10,272	118,455	73,281
Barb wire.....	6,888	5,949	60,702	53,375
All other wire.....	11,792	5,981	75,218	56,744
Cut nails.....	1,306	427	7,678	6,882
Wire nails.....	7,901	2,699	37,349	25,201
All other nails, including tacks.....	567	1,032	8,162	6,047
Pipe and fittings.....	17,066	12,159	126,611	126,835
Totals.....	215,667	122,340	1,329,442	1,019,012

It is interesting to note that of the above named March exports of billets 28,444 tons went to the United Kingdom, while the remainder went to Canada.

The imports of commodities for which quantities are given aggregated 23,533 gross tons in March, as compared with 20,454 tons in February. The details of such imports for March and for the nine months of the fiscal year ending with March, as compared with the corresponding periods of the previous year, are as follows:

Imports of Iron and Steel.

Comodities.	March.		Nine months ending March.	
	1911.	1910.	1911.	1910.
	Gross tons.	Gross tons.	Gross tons.	Gross tons.
Pig iron.....	11,578	21,362	159,092	178,167
Scrap .....	1,923	14,469	20,004	108,862
Bar iron.....	2,298	3,243	23,414	20,690
Billets, bars and steel forms n.e.s.....	5,041	5,386	32,514	25,604
Sheets and plates.....	235	468	3,041	4,541
Tin and terne plates.....	1,157	7,094	38,136	50,847
Wire rods.....	1,301	2,150	13,978	9,774
Totals.....	23,533	54,172	290,179	398,485

The imports of iron ore in March were 134,785 gross tons, against 94,820 tons in February and 163,633 tons in the month of March, 1910. The total importation of iron ore in the nine months of the fiscal year ending with March was 1,663,970 gross tons, against 1,741,293 tons in the similar period of the previous fiscal year and 718,759 tons in 1909. Of the March imports of iron ore 85,000 tons came from Cuba, 27,175 tons from Sweden, 22,357 tons from Spain, 230 tons from Canada and 23 tons from other countries.

The total value of the exports of iron and steel and manufactures thereof, exclusive of ore, in the nine months of the fiscal year ending with March, was \$164,881,449, against \$128,442,680 in a similar period of the previous fiscal year, and in the year 1909, \$105,148,957. The total

value of the imports of iron and steel and manufactures thereof, exclusive of ore, for the nine months of the fiscal year ending with March was \$26,249,869, against \$28,237,323 in a similar period of the fiscal year 1910 and \$15,579,347 in 1909.

### General Electric Apparatus for Dilworth, Porter & Co., Inc.

Dilworth, Porter & Co., Ltd., Pittsburgh, Pa., are enlarging their mill and will install an electric drive. They have ordered the following apparatus from the General Electric Company: A 1500-kva. mixed pressure turbine, which will run from the company's present rolling mill engines; one 25-kw. turbo exciter, a 700-hp. mill motor, a 350-hp. mill motor, two 20-hp. totally inclosed motors, six 7-hp. mill motors, two 75-hp. vertical motors, three 40-kw. power transformers, switchboard, controlling apparatus, &c.

The 700-hp. motor will be connected by rope drive to an 18-in. mill. The 350-hp. motor will be direct connected to a spike rod mill, the 20-hp. motor driving the bull heads. The 7-hp. motors are of the reversing mill type and will drive tables, cooling beds, &c. The vertical motors will drive pumps that supply condensing water for the turbine, as well as water for general use around the mill. The small transformers will supply low tension current for the 20 and 7 hp. motors. The switchboard and control will be in accordance with the most modern steel mill practice. A graphic recording wattmeter, with transfer switch mounted on the power station switchboard, will enable a careful record to be made of the operation of either of the large motors.

### Rails for the National Railway of Hayti

The National Railway of Hayti, which has received important concessions from the Haytian Government, will build 350 miles of railroad, and large outlays will be made in the United States for rails, bridges and equipment. The financing has been done in part in this country by W. R. Grace & Co. and others, and European capital is also interested. The construction work, which will begin at an early date, will be carried on by the Caribbean Construction Company, of which L. H. Shearman of W. R. Grace & Co. is president. C. G. Young, 60 Wall street, New York, is consulting engineer. It is expected that rail purchases will be made in the near future, the requirements being about 26,000 tons of 48-lb. rails. A considerable amount of bridge work will be needed, but for this specifications have not yet been completed.

J. C. Wallace of the American Shipbuilding Company, (Cleveland, wh.) is interested in the Western Dry Dock & Shipbuilding Company, Port Arthur, Canada, announced April 20 that the latter company would immediately start work on the erection of an additional plant to manufacture stationary, marine and locomotive boilers, engines and pumps, and to do general engineering contracting. He also stated that it was the intention of the company to make this works the largest in Canada. The company will build docks. A large amount of machinery will be required.

The plant of the Hoffman Heater Company, Lorain, Ohio, manufacturer of gas water heaters, has been sold to new interests, and the company has been reorganized by the election of the following officers: President, A. H. Babcock; vice-president and manager, S. A. Ault; secretary and treasurer, J. M. Jones. Mr. Ault was for several years traveling representative of the old company.

The Council Bluffs Junk Company, dealer in old material, claiming to be the largest dealer in scrap iron in Iowa, has installed in its yard at Council Bluffs, in that State, one of the Cedar Rapids Foundry & Machine Company's No. 6 shears.



## A Large Toledo Single Crank Press

A single crank press capable of exerting a pressure of approximately 2000 tons has been recently completed by the Toledo Machine & Tool Company, 1736 Dorr street, Toledo, Ohio, for the Youngstown Iron & Steel Company, Youngstown, Ohio. This machine, which weighs 275,000 lb., is intended for manufacturing heavy steel products such as embossed plates for burial vaults or caskets; doors, platforms, plates and other parts for steel Pullman cars and passenger coaches; steel axle housings and large heavy brake drums for automobiles and work of a similar character. Fig. 1 is a general view of the machine and Fig. 2 shows the slide, the pitman and the pitman screw assembled, the combined weight of these parts being about 39,000 lb.

The customary threaded pitman screw fitted with a power elevating attachment controlled by the lever on the left of the press is provided for the slide. This slide is operated by a pair of friction clutches attached to the arch in the rear of the press. From these clutches power is transmitted by miter gears to a horizontal shaft, which runs forward and connects with the vertical shaft at the front of the machine through a second pair of gears. This vertical shaft runs down to the lower pitman and connects with the pitman screw through a worm and worm wheel. If it is desired to obtain a closer adjustment of the slide, a hand wheel attachment can be applied to the lower pitman.

A very large and powerful friction clutch attached to a shaft running in pedestal bearings operates the press

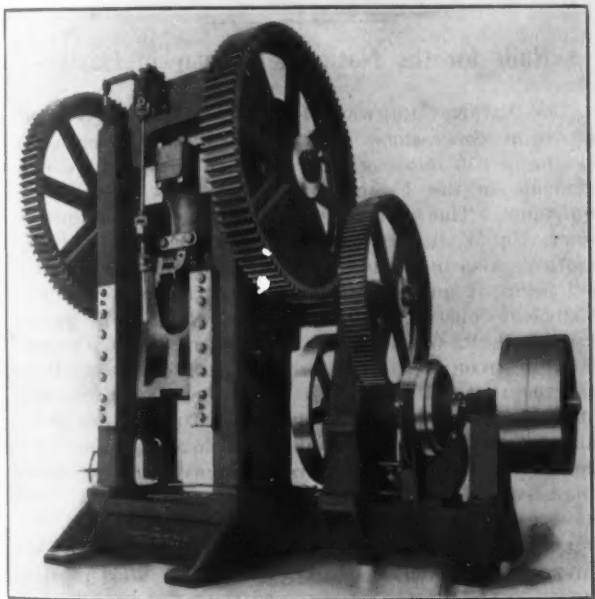


Fig. 1.—A Single Crank Press Weighing 275,000 Lb. Built by the Toledo Machine & Tool Company, Toledo, Ohio.

itself. These bearings are mounted on an extension which is securely and accurately fitted to the main frame of the press. This shaft is 16 in. in diameter and weighs 14,000 lb. In this way the shaft which carries the belt pulleys and the balance wheel is kept in accurate alignment for the pinions and the gears. The friction clutch controlling the movement of the press is operated by a steel spider, which is keyed to the shaft and has a double hardwood facing. Powerful bell cranks connected to the sliding spider of the clutch give the friction required for driving. Double back gears with a ratio of 54 to 1 are provided for the press, and the larger back shaft, to which the two steel pinions engaging with the main twin gears are attached, is sufficiently large to prevent any distortion. In this way the large driving power required to give the necessary ram or slide pressure is divided equally between the two gears. The diameter of these gears is 123 in. and the weight is 19,000 lb. each. Four large steel rods, 8½ in. in diameter, running up from the bottom of the press bed to the top of the arch, serve to reinforce the main frame.

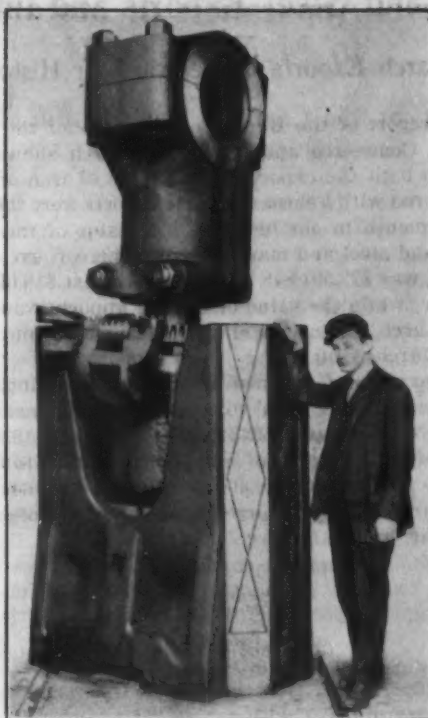


Fig. 2.—The Slide, the Pitman and the Pitman Screw Assembled. The Weight of These Three Parts Is About 39,000 Lb.

The following table gives the principal dimensions and specifications of the press:

Overall height, feet.....	23
Size of bed, inches.....	60 x 60
Length of slide stroke, inches.....	18
Diameter of driving pulleys, inches.....	60
Face width of driving pulleys, inches.....	12½
Width of driving belt, inches.....	12
Pressure exerted, tons.....	2,000
Ratio of double back gears.....	54 to 1
Diameter of crank shaft, inches.....	16
Weight of crank shaft, pounds.....	14,000
Diameter of main gears, inches.....	123
Weight of main gears, pounds.....	19,000
Weight of press, pounds.....	275,000

Before shipment the press was completely assembled, set up and tested at the builder's works under actual working conditions, except that the reinforcing rods were not shrunk in position and the nuts were merely tightened in the ordinary way. Afterward the entire press was dismantled and the frame taken apart for shipment. For shipping the press six cars were required, and when it arrived at the Youngstown plant the various parts of the large frame were fitted together. The reinforcing rods were heated, placed in position in the frame and allowed to cool and shrink the frame together solidly, thus securing practically the results of a solid steel frame.

**Conference on Scientific Management.**—Dartmouth College, through its school of business administration, the Amos Tuck School of Administration and Finance, announces a conference on scientific management for the benefit of the manufacturers and business men of New Hampshire and neighboring States to be held at Hanover, N. H., October 12, 13 and 14, 1911. Among the addresses scheduled are the following: Frederick W. Taylor, "The Principles of Scientific Management"; Henry L. Gantt, "The Task and the Proper Day's Work"; Harrington Emerson, "The Opportunity of Labor Under a System of Scientific Management"; James M. Dodge, "The Spirit in Which Scientific Management Should Be Conducted."

"Hurd's Iron Ore Manual," a handbook of Lake Superior ores, prepared by Rukard Hurd, secretary of the Minnesota Tax Commission, is in press and will be ready for distribution within two weeks. Orders placed through F. M. Catlin, sales agent, 510 Capital Bank Building, St. Paul, will be filled at the preliminary price, the regular price becoming effective June 1.

## A Novel Application of Motor Drive to Machine Tools

### Details of the Changes Made in the Shops of the Chicago Railways Company

The West End avenue machine and woodworking shops of the Chicago Railways Company, Chicago, Ill., have been recently converted from belt driven shops to ones employing the individual motor drive. The special features of this installation are the application of motor drive to old machine tools, the use of strap iron brackets made in the company's shops to support the motors, and the large number of automatic starters which are used, not alone for the constant speed motors, but also for the adjustable speed ones, which is somewhat unusual. In making this change the engineering department of the company was assisted by the Reliance Electric & Engineering Company, Cleveland, Ohio, who furnished all the motor equipment.

The object sought in making the change was to effect a saving in power by making possible the use of individual machines especially for overtime work without running the 75-hp. motor, which was formerly used for driving the entire line shafting of the machine shop, to increase the productive capacity of the machines by a more powerful drive with an easy and convenient method of speed control for the wide ranges and to increase the efficiency of the shop in general by rearranging the machines to afford the greatest convenience in handling material. Fig. 1 shows an 18-in. lathe, which was converted in this way, and Fig. 2 gives a view of a portion of a group of radial drills.

A number of problems presented themselves in planning the installation, and one of these was to have as little wiring as possible on the machines, as the motors were installed on a 550-volt direct current grounded circuit, the power being taken from the company's lines. In the case of the constant speed motors this was overcome by selecting automatic starters that could be placed on the wall and controlled by push buttons, placed in convenient locations. In this way the only wiring required on the machine was for the push buttons, and these required a pilot circuit carrying only about 1-6 amp. In the case of the adjustable speed motors the choice of the controlling equipment proved more difficult.

When motor drive is applied to belt driven tools equipped with cone pulleys it is necessary to remove the cone pulley, which in some of the older types was designed to cover a wide range of speed with only a single

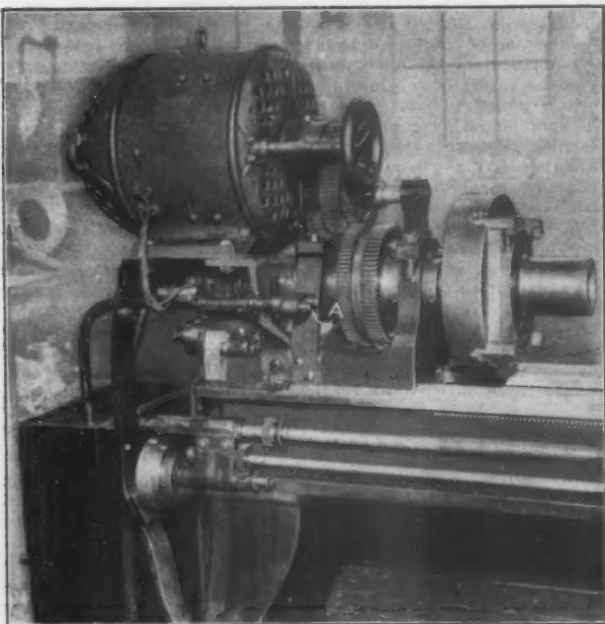


Fig. 1.—An 18-in. Lathe Changed from Belt to Motor Drive by the Application of a  $3\frac{1}{2}$ -Hp. Motor Built by the Reliance Electric & Engineering Company, Cleveland, Ohio.

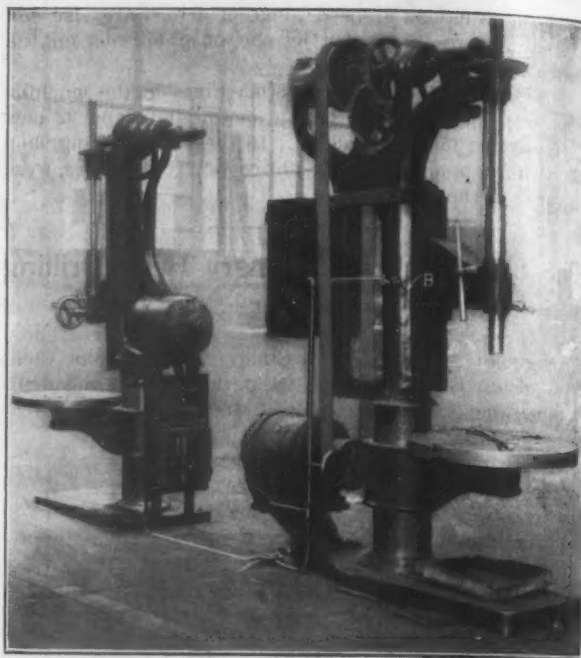


Fig. 2.—Two of a Group of Upright Radial Drills.

back gear. On such machines it is necessary to use either a wide range adjustable speed motor or to provide a number of additional changes if one of medium range is selected. After a careful investigation of the different types of motors that could be used, the Reliance adjustable speed motor of the armature shifting type, which is practically the same as the Lincoln motor which was illustrated in *The Iron Age* March 1, 1906, was chosen.

As illustrated in Fig. 1 the lathes offer an example of the methods employed in making the changes. The cone pulley is replaced by a quill, as shown in the engraving, and the motor drives direct to this quill through an intermediate idler shaft which gives a double reduction. This shaft can be supported either from the head casting, as is the case in the lathe illustrated, or from a suitable boss on the vertical arm of the motor end yoke. For these idlers a stationary stub shaft is used, and the two idlers are mounted on a common bushing. The push button control is shown at A. In this particular instance the back gear ratio of the belt driven machine was 1 to 10, which was changed to 1 to 6, with a motor having a speed ratio of the same proportion. In this way a continuous range of spindle speeds having a ratio of from 1 to 36 was secured. If a motor having only half as great a speed ratio was used, an additional gear change would have to be provided, as otherwise there would be a difference of over 300 per cent. between the range of spindle speeds obtained with the back gear in and those obtained with it out. By using a motor having this speed ratio in connection with the back gear ratio of 1 to 6, a continuous range of spindle speeds was obtained without any gap. This change was made very easily, as all that had to be done was to change the diameter of the two tall gears without making any change in the face gears or the locking device between the large face gear and the quill. In changing these two tall gears they were moved to the front of the tool as shown, thus allowing the motor to be set low over the head.

The way in which the drill presses were changed is illustrated in Fig. 2, as well as the manner of running the conduit and the use of an occasional casting to support the motors. In making these changes the lower cone pulley was removed and the motor mounted in its place on a casting or a strap iron bracket. In this way no more floor space is required than with the belt driven machine. The motor is connected to one of the steps of the upper driving cone pulley by a belt, and when additional power is needed this cone pulley can be replaced by a wide face single pulley giving, if necessary, double the belt capacity of the ordinary cone drive, and comparing favorably with an all-gear driven drill. In this

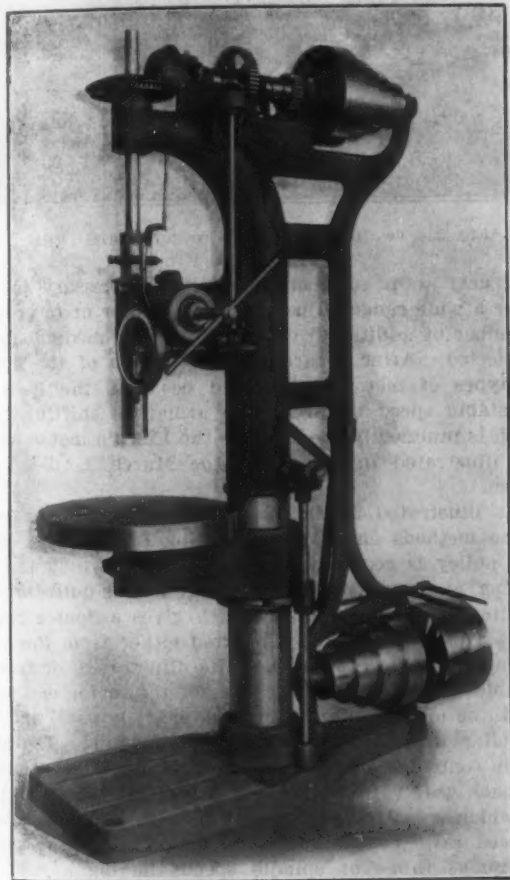


case motors having a speed range of 1 to 6 are also employed and are controlled by the push buttons on the column, as at B.

In making these changes 48 machines in the machine shop were changed from belt to motor drive and 22 new motor driven machines added. In the woodworking shop 56 machines in all, including 23 practically new ones, were changed to the motor drive.

### The Sibley 24-In. Stationary Head Drilling Machine

A recent product of the Sibley Machine Tool Company, South Bend, Ind., is a 24-in. stationary head drilling machine with geared feed. Its distinguishing fea-



The New 24-In. Stationary Head Drilling Machine Built by the Sibley Machine Tool Company, South Bend, Ind.

tures are the solid, compact design and the extreme simplicity of its construction. As compared with some other tools made by this company the height, 82½ in., is considerably less, although the range of work and the feeds and the speeds are the same.

The power for the geared feed mechanism is transmitted from the top driving shaft, and all of the gearing in the train is completely inclosed and runs in an oil bath. Four feed changes ranging from 0.007 to 0.02 in. per revolution of the spindle are available, and, together with the neutral position in which none of the feeds are engaged, are secured by moving a small knob in the center of the hand wheel. An automatic stop collar on the spindle sleeve trips a latch when the hole has been drilled to the desired depth, and when this stop operates the worm is taken out of engagement with the worm gear operating the feed.

The following table gives the principal dimensions and specifications of the drill:

Overall height, inches.....	82½
Maximum distance between spindle and base, inches.....	42½
Maximum distance between spindle and table, inches.....	27
Traverse of table on column, inches.....	18
Diameter of table, inches.....	21
Diameter of column, inches.....	7
Diameter of spindle, inches.....	1½

Diameter of spindle sleeve, inches.....	2¾
Travel of spindle, inches.....	9
Morse taper of spindle.....	No. 4
Ratio of bevel gears.....	2 to 1
Ratio of back gears.....	4½ to 1
Number of spindle feeds.....	4
Minimum feed per revolution of spindle, inches.....	0.007
Maximum feed per revolution of spindle, inches.....	0.02
Diameter of driving pulleys, inches.....	12½
Number of cone pulley steps.....	2
Diameter of large cone pulley step, inches.....	11½
Diameter of small cone pulley step, inches.....	5¾
Face width of cone pulley steps, inches.....	2¾
Speed of countershaft, revolutions per minute.....	300
Minimum spindle speed, revolutions per minute.....	16
Maximum spindle speed, revolutions per minute.....	315
Floor space required, inches.....	55½ x 19½
Net weight of machines, pounds.....	1,400

The rigidity of the tool and the geared feeds adapt it for modern manufacturing where heavy cuts have to be taken, and the results obtained from the severe tests given this type of feed by the builder has led the company to adopt it for its entire line of drills, with the exception of the 20 and the 22½ in. sizes.

### Steel Corporation Construction in the Birmingham District

Advices from Birmingham, Ala., are that about two-thirds of the men who were recently thrown out of employment by the completion of parts of the construction work on the new plant of the American Steel & Wire Company at Corey and by the stoppage of work on other parts have been re-employed. The tariff phases of the incident have been discussed pro and con in the Birmingham newspapers following the pronouncement of Congressman Underwood on the floor of the House at Washington. Chairman E. H. Gary of the United States Steel Corporation has issued the following statement:

The subsidiary companies of the United States Steel Corporation have been working upon a plan for the expenditure of large sums for extensions and new buildings and equipment at Birmingham. A large part of the buildings has been constructed, and they will be promptly completed. In fact, the work could not be interrupted without serious detriment. This includes a large reservoir and water plant and a large number of by-product coke ovens for the Tennessee Coal, Iron & Railroad Company, and also includes a large wire plant for the manufacture, among other things, of wire products by the American Steel & Wire Company. It was intended to erect a large number of residences for occupancy by the men to be employed, and it was also intended to install expensive machinery.

It has seemed to the officials of the Steel Corporation that House Bill No. 4413, reported by the Committee on Ways and Means to the House of Representatives, if it should become a law, would seriously affect the manufacture and sale of some wire products in the Birmingham district because of the low cost of production of these articles in foreign countries, and the low rate of transportation in returning ships. Therefore, local officials were advised to suspend or postpone consideration of the question of making contracts for residences or for extensions or equipment of the mill's until after the whole subject matter could be carefully considered. The advices seem to have been misinterpreted to some extent and all or much of the work on the buildings in progress of construction was interrupted. Upon learning this fact, the local officials were advised of the real intention of those in authority, as above stated, and work was thereupon resumed. As to exactly what uses the wire buildings will be put to cannot be definitely or certainly stated at this time, but it is believed they will eventually be utilized for some lines of steel manufacture.

There has been no intention or effort to influence or antagonize legislation. We present our views and reasons when asked, but submit without question to the decision of those who are responsible for legislation and its results. We have a good opinion of the Birmingham properties and hope in time to operate them at a reasonable profit. Our action, however, has been and will be based on what we consider sound business principles.

A large steel works will be built by the Krupps in Upper Silesia and negotiations are reported to be under way for a reduction in freight rates on products intended for the Russian, Austrian and Balkan States markets. Two railroads traverse the district in which the new site has been chosen.

No. 1 Paxton furnace of the Central Iron & Steel Company, Harrisburg, Pa., was blown out April 22 and will be relined.

**W. D. MESCHER & SONS,**  
Mechanical and Civil Engineers,  
PITTSBURGH, PA.

## The Davis Cast Steel Car Wheel

The conditions in railroad service which have brought forward the steel car wheel have been referred to in these columns from time to time. As is well known, different opinions have been advanced as to the type of wheel which will best meet the requirements of present day service—wheels which will not only have sufficient strength to carry the loads now put upon them, but that

a blank gear pattern. In these it was discovered that by adding ferromanganese to the molten steel when it was poured a casting of any desired degree of hardness could be produced. The problem was, however, to get the necessary hardness in the casting, where it was wanted, and at the same time leave the central part soft enough to be machined. This was finally solved by re-



Fig. 1.—Making the Molds for the Davis Steel Wheel.



Fig. 2.—Molds Ready for Filling.

will meet the conditions resulting from high speeds. The American Steel Foundries has developed the Davis one wear cast steel wheel to meet the demand for a wheel for freight service having the strength of the steel tired wheel and the wearing qualities of the chilled cast iron wheel. It is the invention of J. C. Davis, assistant to the first vice-president of the American Steel Foundries.

The investigations which led to Mr. Davis' invention date back 10 years, when the inventor was on a train which was derailed by a broken flange of a cast iron wheel. Chemical and microscopic examination revealed sulphur segregation at the point of failure. The first experiments looking to the new development were with

volving the mold at the time of filling and introducing the ferromanganese in such a way that it would affect only the outer portion of the wheel. Thereupon special apparatus and molds suitable for full-sized wheels were prepared and the experiments continued on a more elaborate scale with proper safeguards at each step. From the thousands of tests thus made a standard was developed for each process involved. The tests at the foundry were supplemented by results from test wheels put in service on various railroads under heavy tender equipment, where the largest mileage would be obtained in the shortest time.

While minute data covering the various steps in the process of manufacture are not supplied, the successive



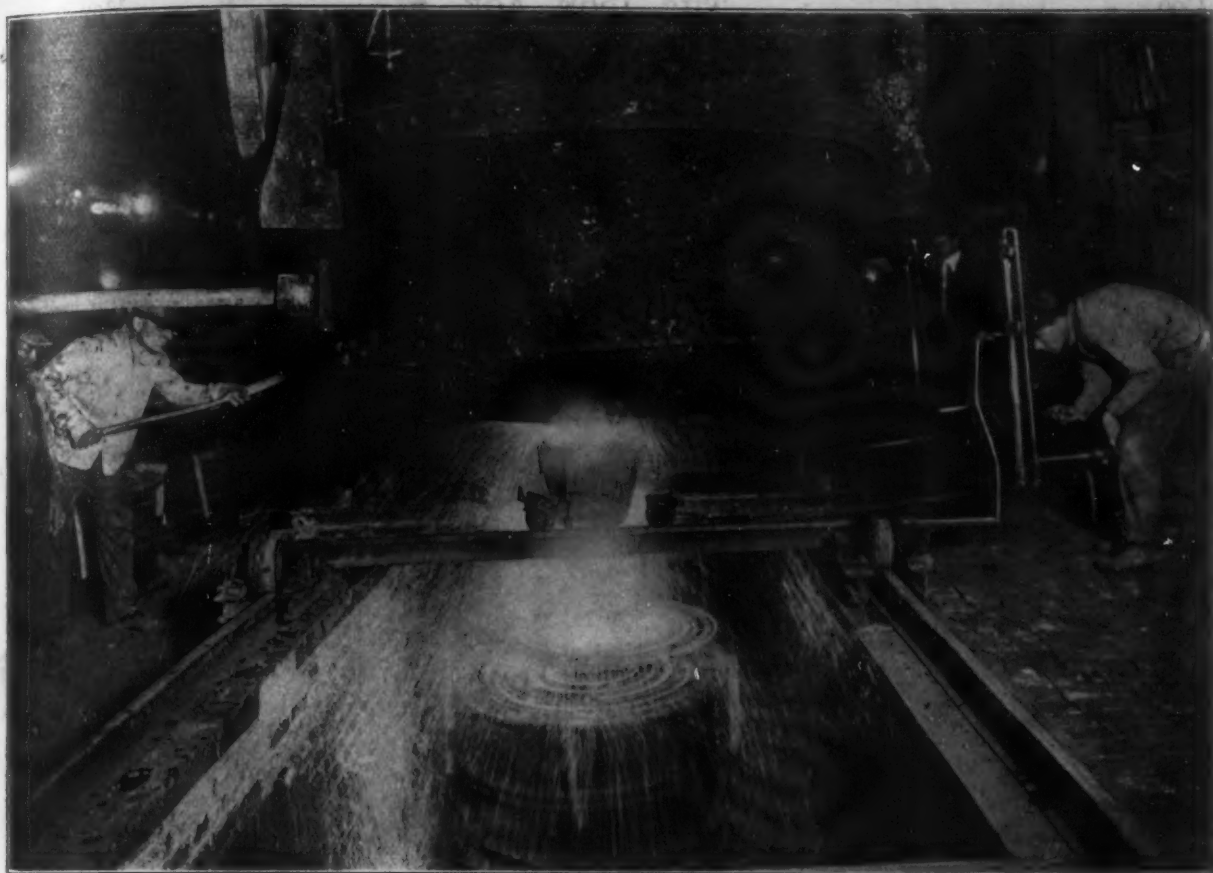


Fig. 3.—The Mold on the Revolving Table During Pouring.

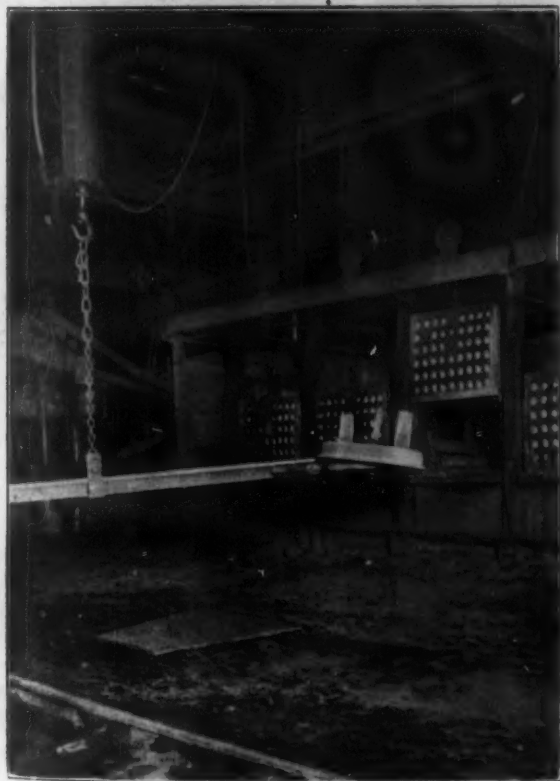


Fig. 4.—Charging Into the Annealing Furnace.

molten metal is being poured into them. The first metal to enter the mold is treated with ferromanganese, introduced by compressed air as the metal passes from the ladle to the mold. The steel thus treated is followed up immediately by soft steel, which forms the plate and hub of the wheel. The revolution of the mold makes it possible to produce regularly in an integral wheel a manganese steel tread and flange with a soft steel hub. The manganese, being heavier than steel, is drawn by the

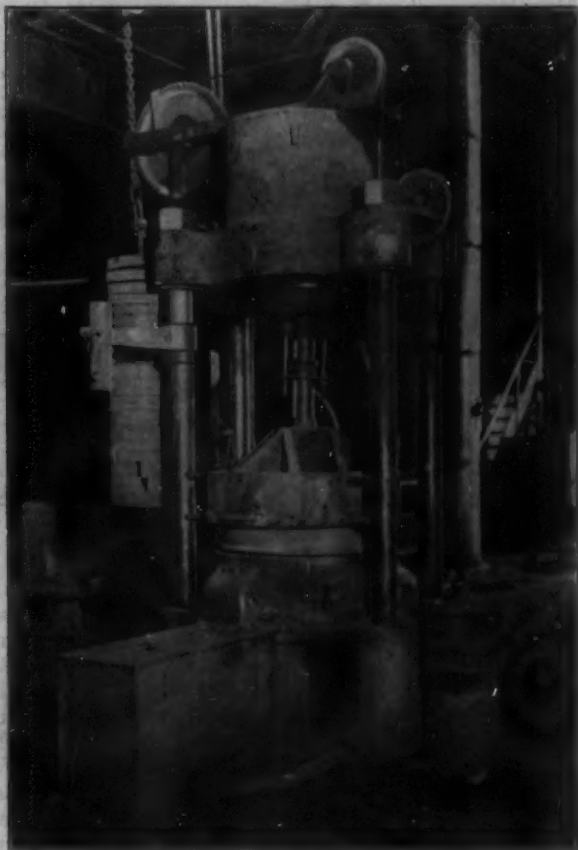


Fig. 5.—Hydraulic Straightening Press.

operations are represented in a general way in the illustrations, Figs. 1 to 8. Formulas have been made for every step from the melting of the material in the furnace to the final machining of the wheel. The methods of determining and controlling temperatures are such as eliminate dependence on human agency and insure uniformity in results. The molds are dried in ovens, the temperature of which is regulated by the use of special pyrometers. The pouring of the molds is an operation of particular interest. When ready for filling they are mounted on tables, which are made to revolve as the



Fig. 6.—Rough Boring.

centrifugal motion to the outer parts of the mold.

The flasks, as the molds are being prepared, stand on tables consisting of parallel beams, as shown in Fig. 1, this arrangement facilitating the handling. The molds are set by cranes in the pit in which they are poured, two molds being in place in the pit at one time. While one is being poured the other is removed by an independent hoist and an empty mold set in its place. The steel from the open hearth furnaces is tapped into a 25-ton ladle, which is carried to the pit by a traveling crane. The steel is poured from the bottom of the ladle,

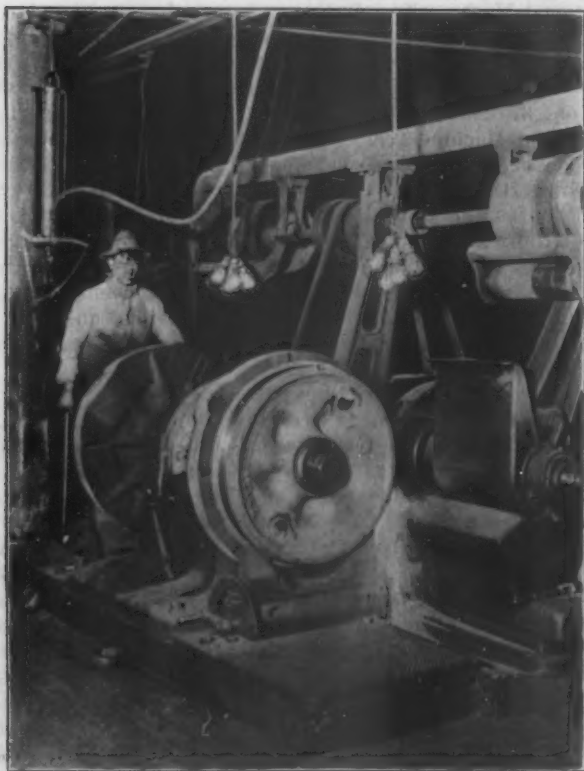


Fig. 7.—Grinding the Tread and Flange.

the flow of metal being regulated by a cone-shaped cup carried by a truck running on tracks laid across the pit, as shown in Fig. 3. As the molds are poured three cranes are in use. One carries the ladle, and on either side a crane takes out a flask that has been poured or puts in one ready for the next pouring.

On their removal from the molds the wheels are given an annealing, the temperature being regulated by a pyrometer. The object of this treatment is to secure a fine molecular structure and eliminate internal strains. From the annealing furnaces the wheels are taken first to a hydraulic straightening press, then to a boring mill where the wheel fit is accurately rough bored to within  $\frac{1}{8}$  in. of the finished size. It then passes to a grinding machine where the tread and the throat of the flange are ground. The machines are arranged for grinding two wheels at the same time. The grinding operation gives a polished surface, and makes the wheels as nearly circular as possible, so that the chance of uneven wear in service is reduced to a minimum. Following the grinding the wheels are again heated and water tempered,



Fig. 8.—Water Toughening.

this operation giving a denser metal in the rim of the wheel and imparting toughness.

The usual custom in the commercial handling of car wheels is followed with the Davis steel wheel. When the full mileage has been made the wheel is applied on the purchase of a new one at scrap value. There is the difference that with the one wear steel wheel the question of temporary loss from service when a multiple mileage wheel is in the shop to be brought back to contour is eliminated, as well as the cost of handling, turning, loss of metal turned off, &c. There is the additional claim of the maintenance of the standard car and coupler heights, with the slight variation in diameter of the Davis wheel throughout its life. The standard 33-in wheel recommended for heavy freight and tender service weighs 600 lb., so that for a car the total weight is nearly 1000 lb. less than that in the case of cast iron wheels and from 1200 to 1600 lb. less than for multiple mileage steel wheels.

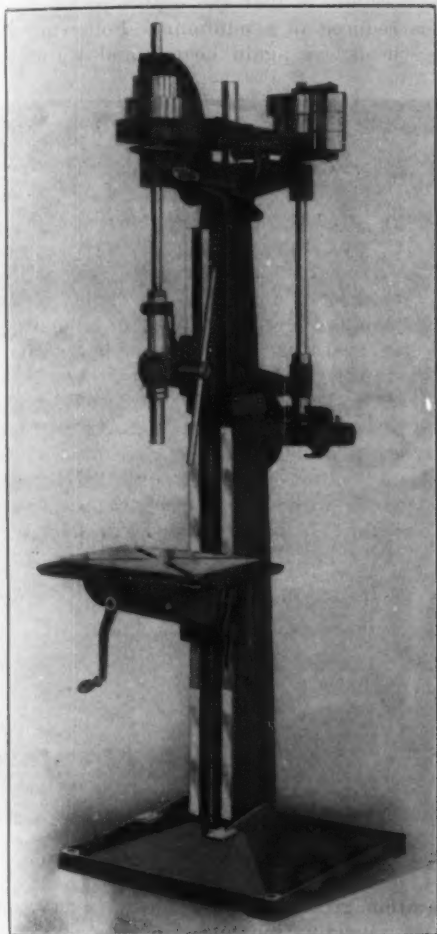
The Brown Hoisting Machinery Company, Cleveland, Ohio, has received a contract from the Didier-Marsh Company of New York for a bridge and transfer car for the coke plant of the Bethlehem Steel Company, South Bethlehem, Pa. The same company has recently received an order from the Pittsburgh Coal Company for a bridge to be erected at Duluth.



## The New Reed High Speed Sensitive Drills

A substantial and very convenient drilling machine has been developed by the Francis Reed Company, Worcester, Mass. In designing the tool, which is of the straight line box type, the proper distribution of metal and provision to withstand stress in use have received considerable attention. These drills are built with one, two, three or four spindles, the first being the type illustrated, and their special features are the shifting mechanisms for the cone pulley and the line shaft belts, the belt tightening device, rigid construction and a centralized control.

A lever at the right of the machine having a vertical movement shifts the cone pulley belts through belt eyes near either pulley. A free movement without causing a



The New Single Spindle High Speed Sensitive Drilling Machine  
Built by the Francis Reed Company, Worcester, Mass.

severe strain on the belt is possible, as the lever is flexible, and any desired speed is instantly obtained by a slight movement of it. The device for shifting the line shaft belt is novel and consists of two pedals located one on either side of the column at the base of the machine. A slight pressure applied to either of them starts the machine, while continuous pressure stops it. The belt tightener swivels around the vertical back shaft and in addition to increasing the belt tension also changes the lap with a corresponding addition to the amount of power transmitted. A hand wheel operates the belt tightener through a rack and pinion on the left side of the machine. The cone pulley belt shifter is interlocked with the mechanism for tightening the belt and the initial movement of the former releases the belt tightener, so that when the belt is shifted it is not under tension.

An endless heavy leather belt is furnished for each spindle, which is bored to correspond to the Morse No. 3 taper to accommodate drills to the maximum capacity of the machine. A heavy top support is provided for the spindle cone pulley, which relieves the spindle of all strain. All the shafts are turned and ground so as to run true and smooth and are mounted in large bronze

boxes which can be renewed at a slight cost when necessary.

A test recently made of the single spindle machine will serve to give some idea of the rigidity of the line. Although this machine weighs only about 480 lb., a 1-in. high speed drill was driven through a piece of cast iron 1 in. thick in 5 sec., while an ordinary drill of the same size was sent through a similar piece of iron in 8 sec.

The following table gives the principal dimensions and specifications of the single spindle drill:

Diameter of spindle in cone pulley, inches.....	1 <sup>11</sup> / <sub>16</sub>
Diameter of spindle in quill, inches.....	1
Diameter of spindle quill, inches.....	1 <sup>1</sup> / <sub>4</sub>
Length of spindle quill, inches.....	8
Vertical movement of spindle, inches.....	9 <sup>1</sup> / <sub>4</sub>
Vertical movement of head, inches.....	9 <sup>1</sup> / <sub>2</sub>
Vertical movement of table, inches.....	30
Size of table, inches.....	12 x 16
Maximum distance between spindle and table, inches.....	36
Maximum size of drill handled, inches.....	1
Morse taper in spindle.....	No. 3
Diameter of tight and loose pulleys, inches.....	8
Face width of tight and loose pulleys, inches.....	3
Number of cone pulley steps.....	3
Diameter of smallest cone pulley step, inches.....	4 <sup>1</sup> / <sub>4</sub>
Diameter of largest cone pulley step, inches.....	7 <sup>1</sup> / <sub>16</sub>
Width of spindle cone pulley belt, inches.....	2
Width of countershaft belt, inches.....	3
Length of top belt, inches.....	34
Diameter of back shaft, inches.....	1 <sup>1</sup> / <sub>16</sub>
Length of rear bearings, inches.....	3
Speed of countershaft, revolutions per minute.....	750
Number of spindle speeds.....	3
Minimum spindle speed, revolutions per minute.....	450
Maximum spindle speed, revolutions per minute.....	1,250
Overall height, inches.....	90
Floor space required, inches.....	25 x 37
Weight, pounds.....	480

In designing this machine accessibility and convenience were made prominent features. The handles for tightening the table, the table elevating crank, the shifter handles for the cone pulley and the line shaft belts and the belt tightener are all operated from the front of the machine, and all movements and adjustments are arranged so as to be within easy reach of the operator when standing in front of the machine.

## The Machine Tool Builders' Convention

In addition to the details given on page 884 of *The Iron Age* of April 13, the following will be features of the programme of the semiannual convention of the National Machine Tool Builders' Association, to be held at Atlantic City, N. J., Thursday and Friday, May 18 and 19: The Membership Committee's report will be presented by C. A. Hoefer, chairman; Patents, C. L. Taylor; Revision of Constitution, A. H. Tuechter; Preparing List of Machine Tool Users, E. B. Bullard, Jr.; Cancellation of Orders, C. Wood Walter; Incorporation, Rufus King; Delegates to Merchant Marine Congress, George J. Burns and P. G. March; Definition of Machine Tools, Fred L. Eberhardt. Alexander Taylor, works manager of the Westinghouse Electric & Mfg. Company, Pittsburgh, will deliver an address on "Department Plan of Machine Tool Arrangement on the Basis of Equipment," in addition to the addresses by speakers previously announced.

**Railroad Equipment Orders.**—The Southern Railway has ordered 65 coaches, baggage and postal cars. The Seaboard Air Line is in the market for 30 caboose cars in addition to the 1000 box and 200 phosphate cars already mentioned. The New York Central Lines are building 1000 refrigerator cars at East Rochester, N. Y. J. G. White & Co., New York, are in the market for 50 steel underframe box cars for Cuba. The Illinois Central is reported in the market for 94 all-steel passenger cars. The Louisville & Nashville has ordered 500 freight cars built at its shops in New Decatur, Ala. The Western Maryland has ordered 500 steel hopper cars from the Standard Steel Car Company. The Chicago & Northwestern has ordered 30 locomotives. The Southern Railway has ordered 50 freight, 23 switching and 20 passenger locomotives from the Baldwin, Lima and American companies, respectively.

# The Baily Electric Furnace\*

## An Electric Furnace for Heating Bars and Billets

BY THADDEUS F. BAILY, ALLIANCE, OHIO.

The possibility of an electric furnace for heating metal without melting was suggested to the writer some years ago on noting the very wasteful and thermally inefficient oil fired furnaces for heating forging stock in a comparatively modern plant in northern Ohio. A calculation of the thermal efficiency of the furnaces in question, which were said to be of the most modern construction, showed

Taking even a case where the least efficient of the modern prime movers, the noncondensing steam engine, was used for generating power, allowing a net thermal efficiency of 5 per cent. for converting the heat value of the coal into electrical energy and assuming a furnace efficiency of 40 per cent., the net overall efficiency for the entire heating equipment would be 2 per cent. The

fuel for creating the steam, however, would cost only one-third as much per heat unit as would the fuel oil for oil furnaces. The commercial efficiency, then, as far as cost of fuel alone was concerned, would be 33 1-3 per cent. in favor of the electric equipment, in spite of the low efficiency of the steam engine. Considering steam engine low pressure turbine units or gas engine driven units in place of the steam engine unit, above considered, the probable efficiencies of electric furnace equipments seemed favorable enough to deserve a place in the industry, while in plants where there was a large supply of exhaust steam available, as is the case in the majority of forge plants, electric energy could be so cheaply produced by the low pressure turbine that no direct fired furnaces could compete with such equipment in cost of heating. The only question then seemed to be whether an electric heating furnace could be designed to successfully heat metal at thermal efficiencies above a given limit.

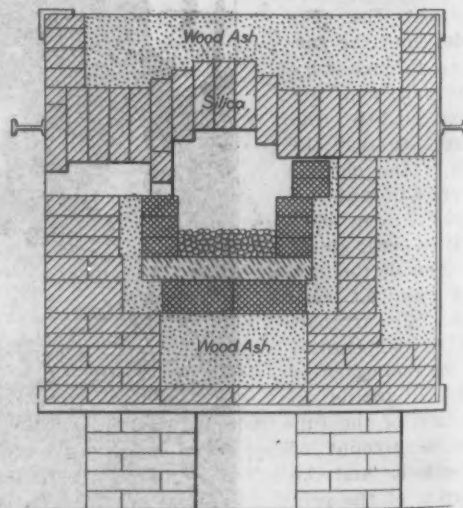
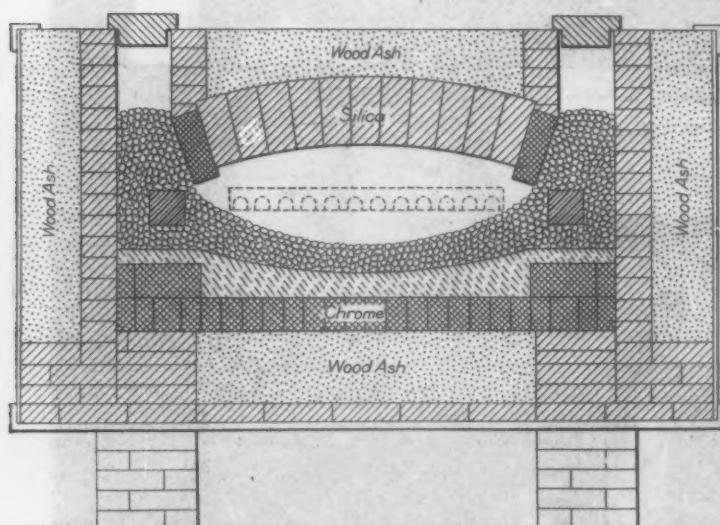
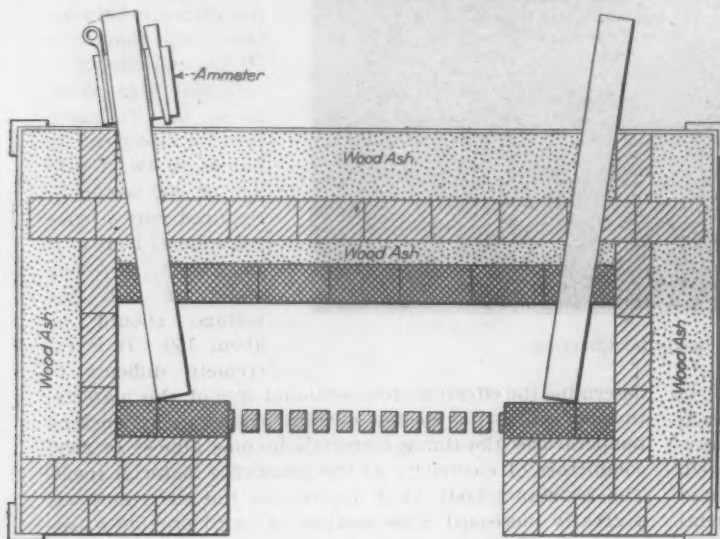


Fig. 1.—Horizontal and Front and Side Vertical Elevations of the Baily Electric Bar and Billet Heating Furnace Built by the Electric Furnace Company, Alliance, Ohio.

that less than 4 per cent. of the heat value of the fuel was delivered into the steel. The technical press and various publications at the time contained a number of descriptions and tests of electric furnaces then in use in the chemical industry and also of furnaces for melting and refining steel. The thermal efficiency of these furnaces was given at from 40 to 80 per cent., and it was at once apparent that if a thermal efficiency of even 40 per cent. could be realized in a furnace for heating stock such as was heated in oil furnaces at a thermal efficiency of only 4 per cent., that a considerable loss could be allowed in the means for converting the heat value of any fuel into electrical energy for use in electric heating furnaces and still effect a saving.

The greatest difficulties encountered in the operation of the first experimental furnaces were due largely to lack of sufficient electric current and control devices. Suitable equipment was, however, obtained by installing the 120-kw. generator and transformer equipment, mentioned later, at the plant of the Transue & Williams Company, Alliance, Ohio, which company generously supplied the power for driving the generator from its gas engine for all the runs on the furnace.

### Description of the Furnace

The following is a description of the furnace evolved out of the experiments commenced over four years ago. Reference may be had to Fig. 1, which gives sectional front and side elevations and a sectional plan of the furnace.

\* From a paper presented before the American Electrochemical Society, in New York City, April 6, 1911.





Fig. 2.—The Bally Electric Furnace Ready for Charging.

The furnace is of the resistance type and consists essentially of two carbon electrodes separated from each other and an intermediate resistance body of a carbonaceous composition in which the heat is generated. In the space directly above the resistance material and directly under the roof of the furnace is placed the metal to be heated, a ledge at the rear of the furnace and one

at the opening supporting the bars or billets, as the case may be. The electrodes enter the furnace through the rear wall and are placed slightly convergent, so that the path of the electric current will be shorter from electrode to electrode at the front of the furnace than at the back. This arrangement compensates for the cooling effect which is greater in the front of the furnace on account of the opening and the charging of the cold material. The electrodes entering the furnace from the rear present comparatively large contact surfaces to the resistance material without the use of special electrode sections. The electrodes are also placed in a plane above the resistance material, which throws the shortest path for the electric current in the upper part of the resistance body and nearest the metal. This is a feature that seems almost indispensable in the successful operation of a furnace of this character, as in the furnaces constructed without this feature the cooling of the upper part of the resistance body by the cold steel caused the electric current to take a lower path, in which portion of the body the temperature became very high and melted out the bottom linings and the bottom of the furnace itself, and at the same time would not maintain the

determine the effective cross sectional area of the material through which the electric current passes, as at working temperatures the lining materials become almost as good conductors of electricity as the resistance material itself. The resistance body as it approaches the electrodes has a greatly increased cross section, so as to provide a better contact with the electrodes, prevent undue heating at

heating chamber at a temperature high enough to heat the metal.

The resistance material is composed of coke or coal. Crushed foundry coke passing over a  $\frac{1}{4}$ -in. mesh and through a  $\frac{3}{8}$ -in mesh screen gives the most satisfactory and uniform results. For a 40-kw. furnace heating 150 lb. of metal per hour the distance between electrodes should be 36 in. and the cross sectional area about 24 sq. in. To maintain an electrical input of 40 kw. a voltage of 200 would be required with a coke resistance body; if the body be composed of coal the voltage should be about 150. It is extremely difficult to

Fig. 3.—The Furnace in Action Heating Eight  $1\frac{1}{2} \times \frac{3}{4}$  In. Bars.

the point of contact and prevent, as much as possible, the dissipation of heat through resistance to the passage of the current except at that part of the resistance body directly under the metal. Thus in a way these increased cross sections perform the mission of electrodes as they conduct the current from the electrodes proper, which are located in a protected part of the furnace, to the part where the transformation into heat is desired, and they do this without much heat being generated in these portions themselves.

The most serviceable lining material so far obtained is made of chrome brick and chrome ore, and while a

certain reducing action takes place between the chrome ore and brick and the carbon of the resistance material it is not of such nature as to seriously impair its usefulness as a lining material. This chrome lining is carried up to at least one course above the resistance material. The lining is readily accessible for repairs or inspection by removing the three courses of silica brick directly under the furnace opening.

The top of the furnace is of silica arch brick, 9 in. thick, and clamped from front to back. A row of chrome arch brick at each side of the roof prevents contact of the silica brick with the carbon in the hoppers above the electrodes.

The sides of the furnace are of silica brick and in the larger furnaces are incased in a sheet steel frame. Insulating material is placed between the silica brick and the casing.

The furnace base is a heavy cast iron plate supported by cast iron legs or brick piers.

The cable terminals are connected with the electrodes by iron sleeves, copper straps and iron wedges. In making the connection the iron sleeve is placed over the end of the electrode and copper straps placed against the four sides of the electrode. The copper cable terminal is then placed between one of the copper strips and the iron sleeve and wedges are driven in on the opposite side between the strap and sleeve to give a firm contact. Wedges are then driven in on the other two sides between the copper strips and the sleeve. In this way the current flow is equally distributed on all four sides of the electrode by the encircling iron sleeve.

#### The Electric Control

The furnace is controlled by a regulating transformer and controller. The transformer gives its full rated output at the lowest voltage rating. While hand regulation is usually provided, the regulation may be made automatic at a slight additional cost. A voltage range of from 33 1-3 to 50 per cent. is usually provided, depending on the operating and starting requirements.

Each furnace is provided with a single panel switchboard, having mounted on it a voltmeter, ammeter, watt-hour meter, circuit breaker and oil switch. The voltmeter and ammeter indicate at all times the conditions on the interior of the furnace, as irregularities are readily noticeable on the instruments. The watt-hour meter enables accurate data to be kept on the current consumption for heating any particular class of work.

#### Lining Renewals

The temperatures that may be obtained are limited solely by the electrical input and the temperatures allowable by the refractory linings of the furnace. The temperature usually maintained in a furnace for the rapid heating of stock for automobile forgings is such as to cause the fusion of the ends of the silica brick forming the roof and is probably not less than 3200 degrees F.; the resistance material, of course, reaches a much higher temperature. When working at the highest temperatures usually met in forge practice a renewal of the lining of the bottom of the furnace will be required every two or three weeks.

The replacing of the lining or portions of it and the replenishing of the resistance material are the only items that may be classed as renewals and should not exceed, in furnaces heating 150 lb. of metal per hour working at the highest temperatures, an average of 20 cents per day for lining material and 5 cents per day for resistance material.

#### Advantages of the Electric Furnace

The metal being heated is maintained in a reducing atmosphere, the high temperature carbon resistance material giving off a gas of a reducing nature. The electric furnace is the only furnace built in small units in which both a high temperature and a reducing atmosphere may be maintained. The saving in oxidation loss is very considerable in small furnaces of this character, as the oxidation in the usual combustion furnaces is the cause of the loss of a large number of forgings due to the fact

that the stock loses volume and does not contain enough metal to fill the dies.

The thermal efficiency of the furnaces varies with the size, the percentage of operation at full capacity and the ruling temperature required. Efficiencies of from 33 to 65 per cent. may be expected in furnaces with heating capacities of from 120 to 1000 lb. per hour.

#### Tests of the Equipment

At the plant of the Transue & Williams Company the power for driving the generator was supplied by a 12 x 16 in. Buckeye four-cylinder twin single acting gas engine, which also drove the generator for supplying current to part of the motors in the machine shop, so that only part of the time was sufficient power available for furnace operation. Belted to the flywheel of the gas engine was a 120-kw. two-phase 440-volt revolving field alternator, only one phase of which was connected up. The leads from this phase were connected with the low tension terminals of a 37½-kw. 440-2200-volt transformer. The current was then stepped down by a 2200-220 or 110 volt transformer. The coils on the low tension side were connected through a double throw switch for either series or parallel operation, so that a normal voltage of either 110 or 220 could be obtained. The variations between 110 and 220 volts on the lower voltage and also on the voltages above 220 were obtained by varying the field of the alternator. By this arrangement a possible range could be obtained of from 90 to 300 volts, which was more than ample for conditions of operation. Inability to readily obtain a 2200-volt generator of proper size accounted for the use of the 440-2200-volt step-up transformer. From the double throw switch the current was conducted to the furnace located in the forge shop, some 75 ft. distant.

The instruments mounted on the switchboard consisted of a 150-volt voltmeter and a 600-ampere ammeter, both made by the Westinghouse Electric & Mfg. Company. The voltmeter was so connected that when the low tension coils of the step-down transformer were thrown in parallel the instrument gave a direct reading and when in series the indicated voltage was half the actual voltage.

The furnace was constructed substantially as already described, except that air spaces were used in place of the insulating material shown in Fig. 1, and the furnace was rated as a 40-kw. unit, having a heating capacity of 120 lb. per hour. The heating capacity was rated somewhat lower than the usual practice on account of the high temperature required. Fig. 2 shows the furnace ready for charging and Fig. 3 shows it heating eight 1½ x 5/8 in. bars.

The electrodes were 4 x 4 x 48 in. long, composed of carbon, and were spaced 36 in. from each other. The cross sectional area of the resistance material was approximately 24 sq. in. The walls were composed of 9 in. of silica brick and were of rather loose construction, owing to the numerous changes that were made and to the jar from the hammers in the plant. The runs on the furnace were made under rather unfavorable conditions, as the forgings that were made under the hammer which the furnace supplied were very difficult to make and unless the metal was very hot would not fill out in the dies. Much delay was also caused by trouble with both the hammer and the dies. Any such delays affected, of course, the amount of metal heated in the furnace.

The stock heated included 1¼-in. square, 1½ x 5/8 in. flat, 1½ and 5/8 in. round bars, in length from 22½ in. to 6 ft. Pieces 4 to 12 in. long were cut off at each heating and the bars replaced in the furnace. From seven to nine bars were heated at a time.

The current consumption was taken over periods of nine hours when heating the heavier of the above mentioned stock, and it was found that from 3 to 3 1-3 lb. of metal were heated per kilowatt-hour.

A voltage of 250 was usually used in starting the furnace in the morning, and from one to two hours was required to bring the furnace up to temperature. The voltage was then reduced to about 200 volts when using a coke resistance body or 150 volts for a coal body, which



tensions enabled the required electric input to be maintained.

Some of the various linings used before the chrome lining was selected were magnesla, carborundum and silica. The chrome lining, however, gave by far the most satisfactory and uniform service, lasting three weeks without renewal or repair. As only the bottom lining is subjected to very high temperature, it is practically the only part requiring renewal, and as the usual bridge wall used in oil furnaces is not required, that saving compensates for the cost of renewals of the lining of the electric furnace.

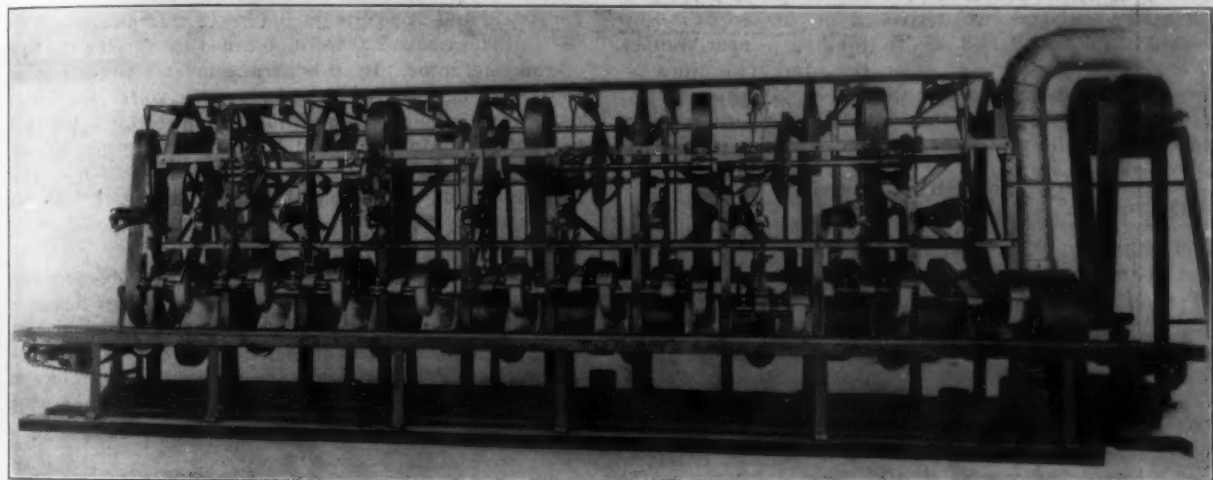
The principal advantages of this electric furnace are its high thermal efficiency, its nonoxidizing atmosphere in the furnace chamber at all temperatures and its freedom from soot, smoke and the hot contaminating gases of the products of combustion.

## The Robinson Automatic Polishing Machine

An automatic polisher that is claimed to effect a saving of from 50 to 80 per cent. in expense and labor and will produce absolutely uniform polished surfaces by one pass through the machine is being manufactured

driven by a worm gear. The work is moved longitudinally on the carriage at an average speed of 1 ft. per minute, a 50 per cent. speed variation being provided by a three-step cone pulley connected to the worm gear. The polishing wheels are driven at a speed of 1850 rev. per min. by leather belting. The power required is  $1\frac{1}{2}$  hp. for each wheel. The entire machine can be operated by belt or chain drive or a direct connected electric motor. The largest or 12-arm machine is 8 ft. wide, 9 ft. high and 34 ft. long.

The polishing wheels are 12 and 14 in. in diameter and are made of glued cotton sections, similar to those used by hand polishers. The first wheel on which the work starts is usually covered with emery cloth to remove the scale, and the last one is a leather finishing wheel of the regular type. Four different grades of abrasives are generally used. All bearings are babbitted and are readily accessible for rebabbiting. As shown in the engraving the machine is equipped with a blower having an opening at the back of each wheel to carry away the dust. The blower is located in the rear at the right end and is belt driven from the main shaft. A set of follow boards or carriages for the work to be polished can be made by a carpenter at a trifling cost. As compared with hand labor it is claimed that the use



An Automatic Machine for Polishing Large Surfaces Made by the Robinson Automatic Machine Company, Detroit, Mich.

by the Robinson Automatic Machine Company, Detroit, Mich. This machine is designed particularly for polishing stove plates and other large surfaces, and for that reason is of particular interest to large stove foundries, but it is claimed that it can be used just as successfully in polishing any surfaces that are free from abrupt angles. The polisher is rigid and simple in construction and easy to operate, one man being able to operate one of the largest size machines.

In operation the work is moved slowly in a longitudinal direction along a carriage operated by an endless chain, and the surface is polished by wheels resting on the work, which in addition to their rapid rotary motion, move backward and forward across the work, each wheel doing its share in polishing the entire surface. The machine is made in 6, 8, 10 and 12 wheel sizes, the 10-wheel type being the one illustrated, and will accommodate work up to 36 in. in width and any length.

The machine is compact, being self-contained in a steel frame, and the entire mechanism is centered in the main shaft that runs the length of the machine. This shaft transmits power to an oscillating countershaft that drives the polishing wheels directly. Crank shafts driven by link belts provide the oscillating motion for the polishing wheels and the table feed, the link belts connecting the crank shafts with a countershaft just back of the main shaft. The cross motion is regulated by an adjustable crank that allows an adjustment of from zero to 36 in. The polishing wheels are held in position by a guide, which is counterbalanced on a walking beam with a knife edge. After the wheels are placed on the machine and the proper adjustment made, no further attention is required. The sprocket wheels operating the endless chain that provides the longitudinal motion are

of the machine results in a saving of 80 per cent. in polishing stove plates and 50 to 60 per cent. on other work.

**The Story of a Grain of Iron.**—James Gayley has recently published a unique booklet entitled "The Story of a Grain of Iron." Little Grain and Oxygen, who are the hero and heroine, "lived deep down in the darkness of the earth surrounded by rich, warm Jasper between two immense strata of Rock." The reader is told how they were separated by the machinations of the Earth Gods, who used Coal to accomplish that end. The transportation of ore and coal and the operations of the blast furnace and the converter are dealt with in the language of fancy, Little Grain finally coming to rest in a steel rail. The denouement is the reuniting of Little Grain and Oxygen by the help of Water, in accord with the inexorable law of the Iron people. The conceit is most ingeniously worked out in a way that gives a new light on the imaginative possibilities of metallurgical science. The story is somewhat longer than Mr. Gayley's well-known comparison of the operations of the blast furnace with those of the human system, which is recalled by his latest excursion into literature.

The Joseph Dixon Crucible Company, Jersey City, N. J., has just published a neat folder entitled "Maintenance Painting for Electric Railways." It gives excellent photographs of street railroad viaducts, power plant stacks and car trucks painted with Dixon's silicographite paint. The folder explains in a very interesting way the special adaptability of this paint for street railroad uses.

# Cast Iron Pipe Molding

## The Ardelt Continuous Turntable System

BY R. ARDELT.

In the issue of the *Foundry* of January, 1911, the pipe foundry at Coshocton, Ohio, belonging to James B. Clow & Sons, Chicago, is described. This pipe foundry uses the new continuous principle brought out by Fred Herbert. It is supposed to represent an improvement over the continuous turntable system, which has for upward of 30 years proved satisfactory in Germany and more recently in other countries. I cannot find an improvement in the straightline method and will explain the reason for my opinion.

In comparing the circular with the rectangular system I refer to the Ardelt continuous molding and casting

hours, and each time only one-half of the flasks attached to the turntable are cast, so that each flask is used four times in 10 hours and each core bar twice.

Between each two turntables a sand tempering and preparing apparatus, with a sand bin which holds a sufficient stock, is always provided. The pipes are shaken out close to the elevator of the preparing apparatus, so that the sand after being moistened will be immediately delivered into the bins without any intermediate handling and falls from the bin directly to the place where it will be shoveled into the flasks.

With eight men at the turntable, four men at the

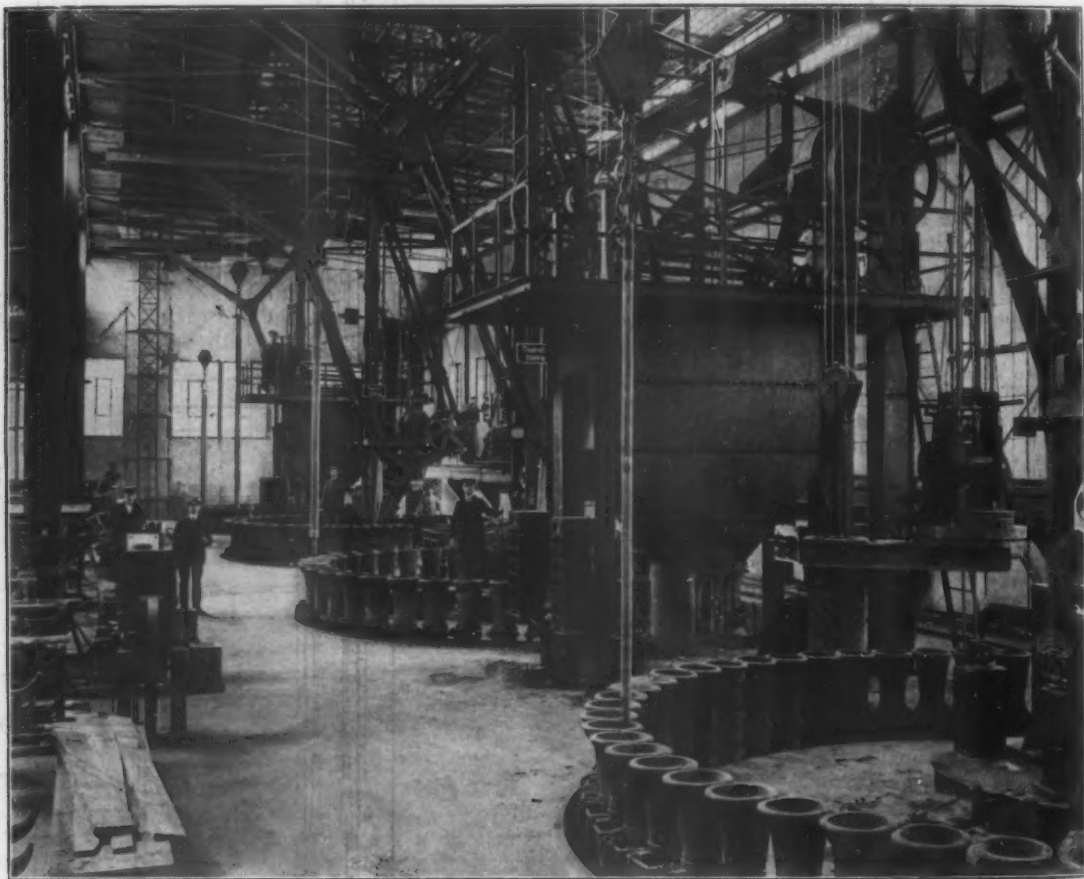


Fig. 1.—The Continuous Turntable System of Molding Cast Iron Pipe, as developed by R. Ardelt & Sons, Eberswalde, Germany.

plant, with turntables and ramming machines, such as supplied by R. Ardelt & Sons, Eberswalde, Germany, and not to the plant of Cochrane & Co., Ltd., Middlesbrough, England, with which I am also familiar. The Ardelt turntable system is illustrated in the accompanying engraving, Fig. 1. At each turntable, to which the flasks are firmly connected, two core drying ovens with core lathes for making the main pipe cores are arranged in such a manner that the cores will be lifted by the three-motor electric jib crane standing in the center of the turntable directly from the drying oven cars and set into the molds. In the same manner the core bars pulled from the molds are returned, without the need of any intermediate means of industrial cars. The ramming machine at each turntable is practically continuously at work, as a separate electric winch is employed for setting and drawing the main patterns. The molten iron is carried by means of a traveling bracket crane, which travels the length of the building and transfers the iron to the jib crane on the turntable for casting. The molds are cast on a turntable eight times in 10

core lathes and one man for making the socket cores—a total of 13 men—the crane man in such a plant will put out 250 pipes of 80 mm. (31½ in.) inside diameter and 3500 mm. (11½ ft.) in length in 10 hours, which is one man for more than 19 pipes.

Those familiar with the operation of a pipe foundry know that, in consequence of the extremely dusty and rough work, the greatest simplicity must be observed, both in the construction of the molding devices and in other equipment, if subsequent high maintenance costs and expensive stoppages of work are to be avoided. The molding apparatus parts which have to be frequently taken off should be secured by cotter pins instead of screws, and all rollers and turning and friction parts should be avoided as far as possible. The molding sand, which will penetrate everywhere, and the inevitable particles of molten iron, which will widely spatter, will soon prevent the proper working of such parts.

Before erecting the Coshocton foundry, an engineer who made an investigation of all the American and European continuous systems of cast iron pipe manufacture



considered the turntable circular system as unsuited for a continuous service, and, therefore, selected the straight line system as safer and more suitable. I shall now endeavor to compare the two methods of work, and to show that the Herbert row method by no means offers any advantages over the older approved circular method with an up-to-date turntable, as designed by an experienced foundry engineer and properly constructed. This is the safest machine that can be devised. Stoppages with such a turntable are practically out of the question. The necessary strength of these tables may be easily obtained by a suitable design. On such a turntable pipes of an inside diameter up to 5 ft. can be made, for which purposes a pressure up to 80,000 kg. (85 tons) is employed for drawing the shaft patterns.

The flasks are longitudinally divided in two sections, one of which is fitted by screws to the turntable and rotates with it. The driving is effected by an electric motor of 4 to 6 hp. The ramming machine is mounted on a swinging bracket, which is secured to a pillar standing outside of the turntable, as shown in section in Fig. 2. The swinging bracket permits the ramming machine to be rapidly centered over the main pattern in the flask; four rammer rods for large sizes of pipes and six to eight for smaller ones will be lowered and raised in ramming the sand at a speed of 120 to 160 strokes a minute until the mold is made. Then the pattern is withdrawn, the turntable revolves till the next flask is in position, the pattern is set in, the machine swung over, and the ramming of the next mold is proceeded with. A few flasks further the mold is blackened, then the molds pass over the drying gas burners, and when sufficiently dried the cores are set in and the molds are ready to be poured. After a short time for cooling, the core bars are pulled, the casting is shaken out and the flasks are ready for further use.

The ramming only must be done at a given spot, owing to the ramming machine and the pattern which above it. It is, however, of no importance, where the other operations are done, as the jib crane in the center of the turntable can reach any point. The objection raised by the author of the article in the *Foundry*, that by a delay at any point the progress of the work on the turntable may be impaired, therefore, does not hold good with regard to the method here described.

The circular travel of the flasks remains undoubtedly the most proper in all respects for a continuous method; it is impossible to find sufficient reasons based on the impracticability of the turntable system to justify leaving this line of travel and converting it into that of following the sides of a rectangle. I am confident that the reason for constructing the continuous row system lies solely in the desire to be able to use the hydraulic pipe molding machine. This machine demands, or at least it is very advisable, that the flasks be attached to the base of the molding machine to enable it to withstand safely the great force with which the pattern is forced into the sand and avoid a vertical displacement of the flask. If the flasks should be secured to a turntable the use of such a machine would be practically out of the question.

In order to use this machine the simple, safe turntable has been discarded, the easily obtained circular travel of the flasks has been dispensed with and a more complicated travel in rectangular lines has been adopted. And how many more constructional parts, which in such a pipe foundry are subject to constant repair, will

be required? Each flask is fitted with four rollers, which must be kept in use; with 144 flasks this means 576 rollers. The ways for the flasks must be kept in perfect order, as otherwise the movement of the flasks

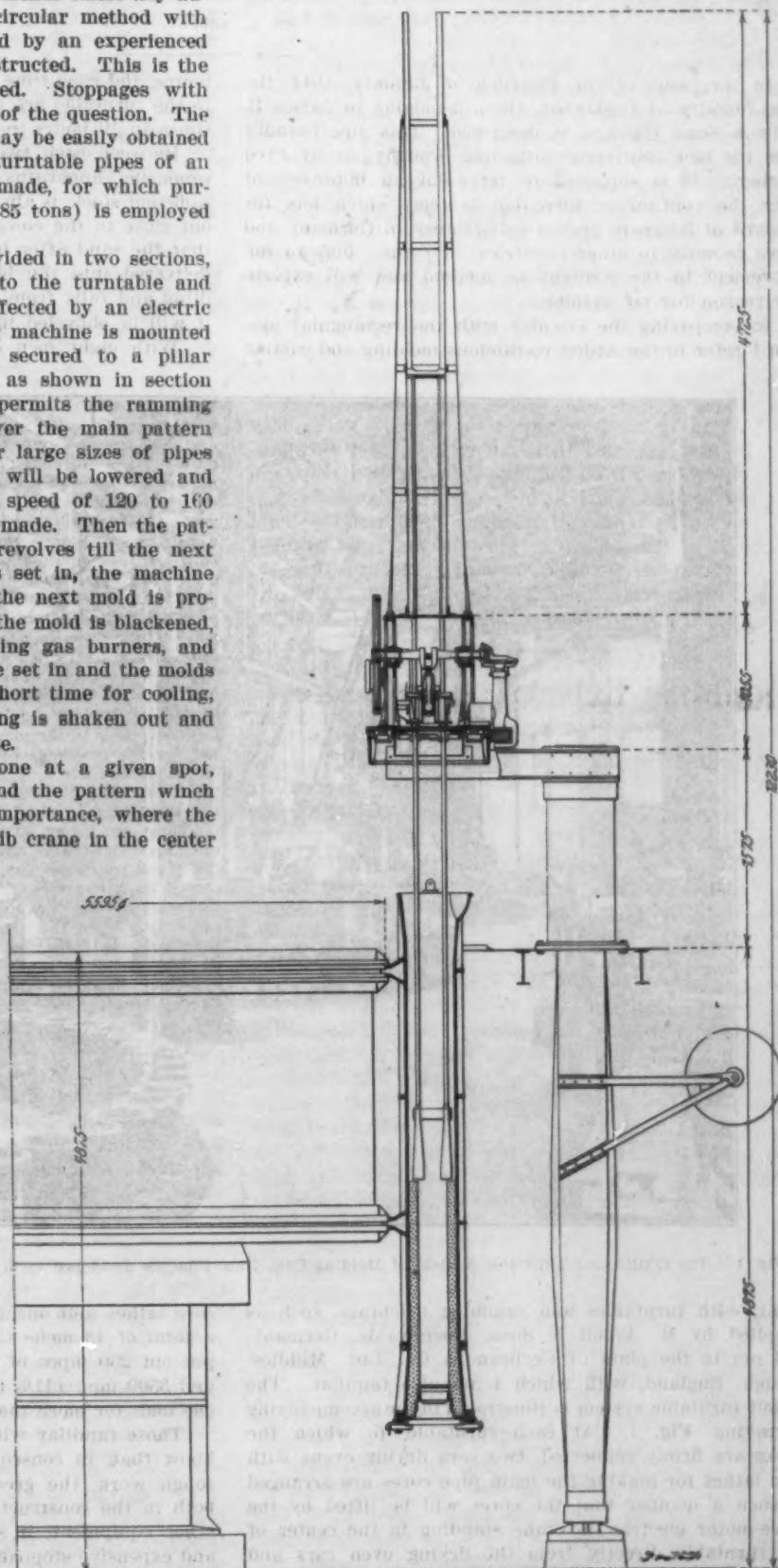


Fig. 2.—Sectional View of the Ardelst Ramming Machine.— Dimensions in Millimeters.

will be obstructed and the working of the plant impeded. For the longitudinal movement of the flasks four hydraulic pushers, and for the transverse movement two transfer cars, also operated by hydraulic rams, are required. The operation of all these apparatus is extremely tedious and wastes much time, as they are too distant from the points of work. (Each flask is used in 10 hours not more than two and one-half times.)

The Herbert system offers advantages with regard to neither simplicity nor safety in working over the turntable system, and still less with regard to cost of attendance and maintenance. The core drying ovens lie so far from the casting shop that each core must be delivered to the latter on cars, which is another disadvantage of this system.

With regard to the pipe molding machine, the objection may be raised that a pattern drawing machine requires high power for forcing the pattern through, therefore the flasks must be made very strong and heavy. With large molds it will be practically impossible to make them in such a manner. The wear on the patterns is also very severe, as they are under a very great superficial pressure through the sand. Therefore, it will be exceedingly difficult to maintain the standard weights of the pipes, as the core maker is not permitted to make the cores smaller so as to correspond with the constantly diminishing outer diameter of the pipes. Furthermore, it will be difficult to maintain the standard diameter sizes, so that serious complaints will arise that they make either too wide or too narrow lead joint openings. Also, the machine works too slowly. Each flask must be first attached to the machine; after the flask has been centered a measuring tube is lowered through, then the sand is filled in, and only then can the machine operate. With our ramming machines the mold is finished in the same time in which the sand is filled in. It, therefore, works considerably faster. There is no need of securing the flasks to the machine and detaching them again after ramming.

## Railroad Rebates on Iron Ore

### Government Prosecutions Under the Elkins Law

At Cleveland, Ohio, indictments against Dan R. Hanna and Robert L. Ireland of M. A. Hanna & Co., and D. T. McCabe, fourth vice-president of the Pennsylvania road, and 17 indictments against the Lake Shore, Pennsylvania, Bessemer & Lake Erie and the Nickel Plate railroads were returned on April 26 by the Federal Grand Jury which has been investigating charges of rebating against railroads and iron ore shippers. The cases are Interstate Commerce Commission cases brought to insure the enforcement of published ore shipping rates. The Government will seek to show that the indicted railroad companies own docking facilities in Ashtabula and Conneaut harbors; that these were operated by companies which were in effect "hired" by the railroads; that the railroads paid excessive rates to the docking companies for unloading iron ore; that the docking companies paid over a portion of the money thus received to the shippers, and that the whole constitutes a conspiracy in violation of the Elkins law.

It has been well known in the iron ore trade that rebates were given by the dock companies on ore unloaded at Lake Erie ports. At the end of the season the consignee received a repayment of 5 cents a ton on all ore put on dock to be later shipped to the furnace company and 12 cents on all ore that was loaded from vessel into cars for shipment to furnace without going on the dock. This practice, it is said, was discontinued in 1909. The old charges of the dock companies, which were in reality subsidiaries of the railroad companies, were 20 cents for unloading, which the vessel owner paid, and 20 cents to the railroad. The rebates were originally given instead of reducing these charges. When the rebates were discontinued the charges were reduced to a total of 17 cents to the vessel and the railroad. At the same time the one rate from Lake Erie dock to Valley furnace was reduced from 74 to 56 cents and to Pittsburgh district furnace from \$1.18 to 98 cents. The Government alleges that the rebates illegally paid by the Pennsylvania Railroad between April 1, 1908, and July 31, 1909, amounted to \$482,000, and those paid by the Bessemer & Lake Erie Railroad to the Carnegie Steel Company between January 1, 1908, and June 30, 1909, reached a total of \$798,000.

President James McCrea of the Pennsylvania Railroad has made public a statement in which, after referring to an "apparent misunderstanding of the public as to what is really involved in the case," he says:

The action of the grand jury, so far as I understand it, is based on the following condition of affairs: During the year 1908 and a portion of the year 1909 iron ore was landed from vessels at docks on Lake Erie belonging to the Pennsylvania Company, which docks were being operated by M. A. Hanna & Co. as a dock company, with whom an agreement was entered into for handling ore from the vessels to the cars and docks of the railroad company. The vessels paid a fixed price per ton for unloading, as the railroad company a fixed price per ton for loading the ore on the cars, the prices thus established being the current prices at practically all of the docks of all railroads at Lake Erie ports.

Owing to the introduction of improved ore handling machinery during this period the cost of handling the ore was found to be less than the sum of the payments made to the dock companies by the vessels and the railroad companies, but the exact amount of this possible saving could not be determined until the close of the season. It was therefore provided in the agreement that after deducting from the gross receipts of the dock company rental, cost of operation and maintenance, and proper remuneration for services rendered, that portion of the saving per ton published in the tariffs of the railroad company filed with the Interstate Commerce Commission, was to be paid currently by the dock company to the consumers of ore, and any additional surplus or saving that might possibly remain at the close of the year should also be apportioned among the consumers of ore in the proportion that the ore received by them over the Pennsylvania Company's lines and connections bore to the total ore tonnage forwarded from the Pennsylvania Company docks. This, of course, absolutely insured uniform rates to all consumers of ore forwarding from those docks.

The tariffs duly published and filed with the Interstate Commerce Commission showed clearly the current payments to be made by the dock company to all these consumers of ore, but appear to have been silent as to the final distribution to be made by the dock company of any possible additional saving; consequently, if in the company's effort to carry out the exact spirit of the law and insure impartial treatment to its patrons, the failure to note in the published tariffs the provision for the final distribution of the possible additional savings, of which every consumer had not only knowledge, but notice, was not strictly in accordance with the law, the violation was only technical and wholly unintentional.

There can be no question of discrimination involved, as all consumers, both large and small, were treated with strict impartiality; there never was, nor could be, any favoritism, for the rate to each one was exactly the same. The indictment of Mr. Hanna, president of the dock company, and of Mr. McCabe, vice-president of the railroad company, for alleged conspiracy, appears to be due solely to the fact that it was they who executed, on behalf of their respective companies, this contract by which exact and absolute equality of rates to all consumers of ore forwarded from the Pennsylvania Company's docks was guaranteed.

The United States Reduction Company, manufacturer of aluminum, babbitt metals, &c., has moved from 505-506 Manhattan Building, Chicago, where it has long been located, into its new offices at 410-426 South Clinton street, which is also the location of its new Chicago warehouse. From this warehouse the company will make local deliveries and less than carload shipments. The new offices are commodious and the warehouse is equipped in a manner that will insure prompt shipments of the high-grade products made by this company. The growing business of the United States Reduction Company has caused its facilities to be enlarged several times in recent years, and each succeeding enlargement has been met with increased demand. Its new building has been erected in anticipation of a continuance of this growth.

The Holophane Company's New York stock room has been removed to the seventh floor of the Sterling Bronze Building, 13 East Thirty-ninth street. All orders will hereafter be delivered to draymen and messengers from this address. The Holophane Company will endeavor to carry, subject to prior sale, sufficient stock of those types of Holophane glass globes and reflectors and Holophane-D'Olier reflectors for which there is the greatest demand. Orders for other types can be shipped direct from the factory at Newark, Ohio, or delivered from New York stock as a rule 10 days or two weeks after receipt of the order. E. N. Hyde is now manager of the New York branch, superseding John W. Foster, who has been assigned to the management of the Chicago branch.



## The Paxson Grooved Roller Sand Mixer

A new type of sand mixer for mixing and blending molding sand in steel foundries has been placed on the market by the J. W. Paxson Company, Philadelphia, Pa. In this new machine rolls having grooved surfaces have been substituted for the heavy flat ones customarily em-

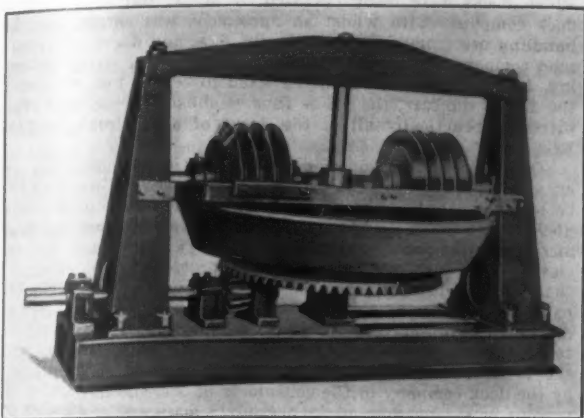


Fig. 1.—A New Type of Sand Mixer for Foundry Use Built by the J. W. Paxson Company, Philadelphia, Pa.

ployed. The use of this type of roll is said to result in a more thorough and intimate mixing of the sand, since their effect is that of cutting rather than crushing and the product of the machine is more refractory and more coarse, which enables the gases to escape readily when the mold is poured. Fig. 1 is a view of the new machine, while Fig. 2 gives an elevation and a plan view and shows some of the constructional details.

The grooved roller sand mixer, as the machine is called, consists of two cast iron box section standards

played for all the shafts. The ends of the roller shaft, which are machined and are fitted with boxes that can be renewed in case of wear, are mounted on the slides. Scrapers which are attached to the frame above the pan keep the rolls clean and direct the flow of sand in the pan. All of the working parts are protected from wear due to the sand falling upon them and are designed to be readily accessible for lubrication.

The machine is driven through the horizontal shaft at the left of Fig. 1 from either a pulley or an electric motor. When the mixer is belt driven a clutch reduces the wear and tear on the belting. The overall height of the mixer is 5 ft. 2½ in. and the floor space required measures 9 ft. 8 in. by 5 ft. The power required to operate the machine is 5 hp.

## A Buyers' and Sellers' Bureau at Cleveland, Ohio

To enlarge the scope of its usefulness not only to its own members, but to all the manufacturing industries in that city, the Cleveland branch of the National Metal Trades Association has inaugurated a new departure, which will doubtless be watched with considerable interest by organizations of manufacturers in other cities. The plan, which has been under consideration for some time, was submitted to the executive board the past week by C. O. Bartlett, president of the branch, and Philip Frankel, secretary, and was adopted. It provides for the establishment of a buyers' and sellers' bureau, which is designed both to aid the buyer as well as to help the seller of products made in Cleveland.

At present, for example, a buyer goes to Cleveland and places an order with one concern for a machine or material. The seller has no further direct interest in the buyer as far as his other requirements are concerned, and the latter is allowed to go his way. Possibly he purchases the balance of his wares in Cleveland and perhaps he does not. He may be in the market for something that he does not know is made in the city. According to the plan to be placed in effect, when a buyer comes to the city he will be referred to a central office, where he will be informed where he can buy what he wants, and from which he will be taken to the places where he can make his purchases. In case a manufacturer receives an inquiry by mail for goods that he does not make and does not know where they can be procured, he is to refer that inquiry to the central office, which will furnish the desired information and bring the buyer and manufacturer in touch with each other.

A part of the plan is to have on file at the bureau of the association catalogues of the Cleveland manufacturers, photographs of their products and a complete card index system showing all the goods manufactured in Cleveland and who makes them. It is believed that when outside buyers become acquainted with the system they will write to the central office direct, and through that be quickly placed in touch with manufacturers of articles that they want. When the plan is permanently established it is the intention to have stenographic service, telephone service and other conveniences for bringing out-of-town buyers and Cleveland manufacturers together. While the plan will be inaugurated by the Cleveland branch of the National Metal Trades Association, all other manufacturers in the city will be invited to participate in the conduct of the bureau, and a conference with other manufacturers will be held the present week, at which the scheme will be submitted to them for approval.

**Heavy Canadian Rail Contracts.**—The Canadian Northern Railway Company, whose head office is in Toronto, has placed orders with the Dominion Steel Corporation and the Algoma Steel Company for 105,000 tons of steel rails, some of which are 60-lb. and others 80-lb. Of these rails 80,000 tons will be utilized on branch lines in the West. Besides its rail purchases, the company is spending \$4,500,000 on rolling stock and power. All the outlay, including an additional \$500,000 for rail fastenings, &c., will be made in Canada. The rail delivery is to be at the rate of 15,000 tons per month.

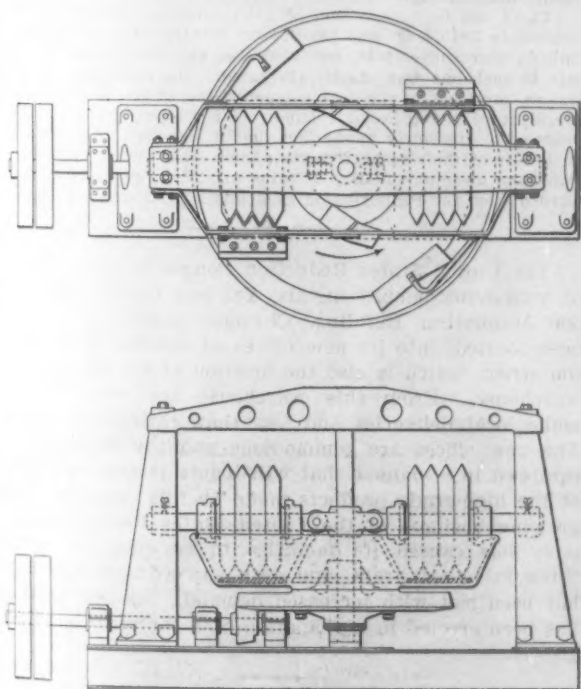


Fig. 2.—Plan View and Elevation of the Mixer.

bolted to 8-in. steel I-beams which form the base, while rigidity and substantial support to the frame are afforded by a top yoke. The sand pan, which revolves on a central shaft, is 5 ft. in diameter. It is a single gray iron casting and is fitted with a renewable chilled iron lining. The driving gear, which receives its power through the horizontal shaft at the left of Fig. 1, is cast in position on the bottom of the pan. The grooved chilled iron rollers are 22 in. in diameter and have a face width of 12 in. They run free on bushed bearings on a horizontal steel shaft held in place by collars, the use of keyways being entirely avoided. Cold rolled steel is em-

## The Gang Sensitive Radial Drill

### A New High Speed All Belt Driven Tool

The William E. Gang Company, 1543 Queen City avenue, Cincinnati, Ohio, has recently developed a new type of radial drill. The field which it was especially designed to cover is driving high speed twist drills ranging from  $\frac{1}{4}$  to 1 in. in diameter at their maximum efficiency. All noise even when running at the highest speed is said to have been done away with by the elimination of all the transmission gears and the substitution

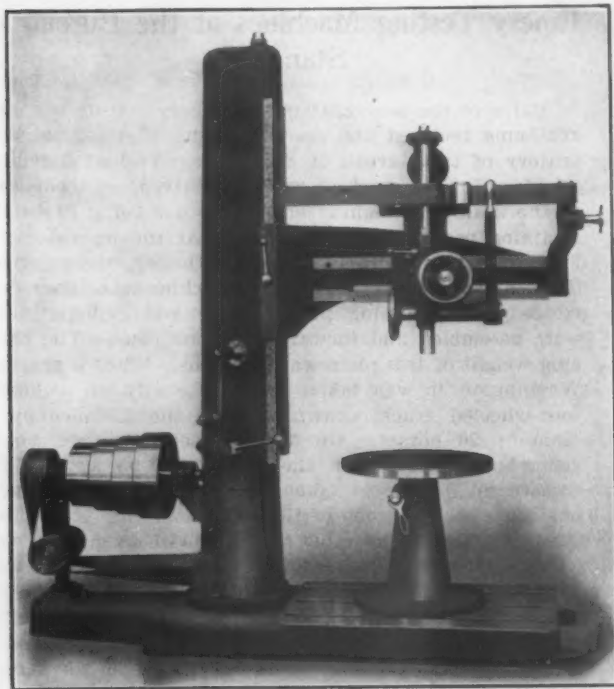


Fig. 1.—A New Type of Belted Sensitive Radial Drill Built by the William E. Gang Company, Cincinnati, Ohio.

of a belt. Fig. 1 is a view of the new tool, and Fig. 2 shows the attachment with which the drill can be supplied when tapping has to be done.

The construction of the machine is of such design as to insure long and satisfactory service. The arms, which are made in three sizes, namely  $2\frac{1}{2}$ , 3 and  $3\frac{1}{2}$  ft., are very rigid, the cross section being in the form of a capital D. Reinforcement is secured by a number of webs. The arm is raised and lowered by a crank at the side of the column and is clamped in position by a ball lever. This crank is connected by a pair of bevel gears with the elevating screw which acts upon a stationary nut bolted to the arm, the thrust of the arm being taken by a ball thrust bearing. The column is clamped in any convenient position by a quick acting cam lever that actuates an hexagonal nut and a draw bolt and a conical roller bearing is supplied to take the weight. The head or saddle which can be securely clamped in any desired position on the arm is moved by a rack and pinion and a hand wheel. All the moving parts are in accurate running balance and are carried on annular ball bearings, which are so mounted that the ball bearings take all radial and thrust loads, and no moving part rests upon a stationary one. This arrangement reduces friction to a minimum, and as all the bearings are incased to protect them from dust or injury, they do not have to be lubricated except at long intervals.

The belt running into the base of the column transmits the power from the driving cone pulley shaft to one extending the full length of the column. On this vertical shaft there is a pulley which is carried on a bracket extending into the column from the radial arm. This pulley is driven from the shaft through a spline and a feather and transmits power to the spindle through a horizontal belt. The arrangement of this belt is such

that, although it encircles half the circumference of the spindle pulley at all times, the same tension is maintained irrespective of the location of the head by the position of the idler pulleys. These are so placed with reference to the spindle pulley that the driving belt exerts a balanced pull on both sides of the latter, due to its equal contact with them, and produces no side strain upon annular ball bearing of the spindle. In this arrangement no springs or counterweights are used, and provision is made for taking up the slack which occurs in both belts on account of stretching.

The hand wheel A, Fig. 2, at the left of the head, brings the spindle rapidly to the work, while the lever B, at the right, feeds it into the work. To maintain the most convenient position for drilling at all times, this lever has a ratchet which is automatically locked by a latch and kept from falling when the lever is thrown into the vertical position. This ratchet does not release the spindle from the control of the lever, but serves to maintain the same relative position of the lever and the drill point. It is not necessary to reset the feed lever for every hole where a number are to be drilled in the same plane. When the lever is pushed slightly beyond the first position of the locking latch, the spindle is freed from its control and can be moved in either direction by the hand wheel. The counterweight directly connected to the spindle makes this feed very sensitive.

Eight spindle speed changes, ranging in geometrical progression from 300 to 1170 rev. per min., are available by the use of a two-speed friction countershaft and a four-step cone pulley. This arrangement gives an average velocity of 80 ft. per minute for sizes of drills varying by 1-16 in. from  $\frac{1}{4}$  to  $\frac{3}{8}$  in., inclusive, and by  $\frac{1}{8}$  in. from  $\frac{1}{2}$  to 1 in., inclusive, and gives good results under average shop conditions. If desired the countershaft can be speeded up sufficiently to give the maximum speed that high speed twist drills will stand.

The tapping attachment illustrated in Fig. 2 operates without shock or jar at any speed required up to 1170 rev. per min., reverses instantly and is absolutely noiseless in operation. It is possible to adjust the tension of the driving belt so that any size of tap can be driven into a blind hole, strike the bottom and be reversed and back out without breaking the tap or injuring the machine. As the spindle alone reverses, sensitivity for tapping is secured as well as for drilling.

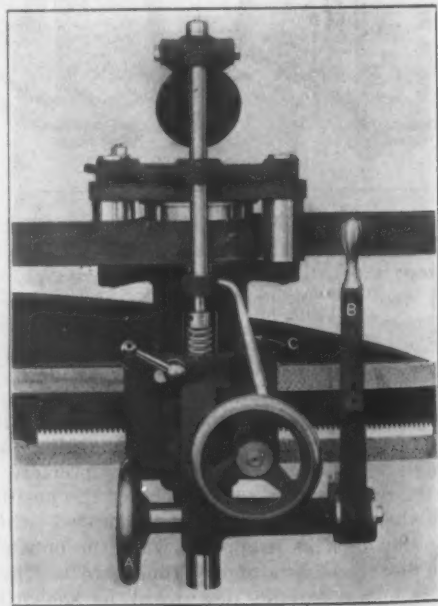


Fig. 2.—The Tapping Attachment Which Can Be Supplied for the Drill.

Like the drive of the machine proper, no gears are used in connection with this attachment and the spindle is reversed by the narrow belt at the top of the head on the upper spindle pulley. The power for this belt is secured from the idler pulleys on the head, which revolve in the opposite direction to the lower spindle pulley. This



belt then drives a pulley supported on a plate directly above the spindle pulley, which runs in the same direction as the idler pulley. A cone clutch is operated by the bent lever C, on the right side of the head, which is located between the two spindle pulleys and is kept in engagement with the lower spindle pulley by a powerful self-contained spring. In this position the spindle runs forward, but by moving this bent lever the clutch can be withdrawn from engagement with the forward spindle pulley and engaged with the reversing one. When the lever is released the spring instantly withdraws the clutch from the reversing pulley and re-engages it with the forward one. For taking up the slack in this belt due to stretching an adjustable idler pulley is provided.

This drill will pull all sizes of United States standard taps up to and including  $\frac{3}{4}$  in. In a test made at the builder's shop a  $\frac{1}{2}$ -in. high speed twist drill, running at 900 rev. per min., was driven through a 2-in. cast iron plate at the rate of 25 in. per minute with a feed of 0.028 in. per revolution of the spindle.

### The Cream City Accident Preventor

A new type of safety device for presses and other similar machines has been developed by the Gendler, Paeschke & Frey Company, St. Paul avenue and Fifteenth street, Milwaukee, Wis. This is known as the Cream City accident preventor, and among the special features

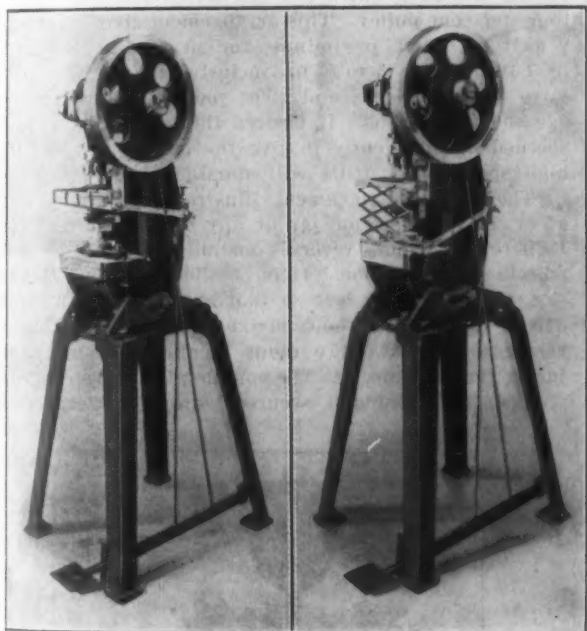


Fig. 1.—Position for Adjusting Tools. Fig. 2.—Position When Punch Is in Use.

The Cream City Accident Preventor for Punches and Similar Machinery Made by the Gendler, Paeschke & Frey Company, Milwaukee, Wis.

possessed by it are that the guard is entirely automatic in action and does not have to be touched when resetting the tools, the mechanism operating the guard is entirely separate from any other part of the machine and the use of the device does not in any way interfere with the output of the machine. Fig. 1 shows the position of the device when the tools are being adjusted, while Fig. 2 gives a view of it as it appears when the punch is in use.

The device consists of a folding gate which when the punch is in use extends downward, as shown in Fig. 2, and effectually blocks the approach to the die. When the operation is completed this gate jumps back into the folded position, Fig. 1, and is entirely out of the operator's way. The use of this device does not reduce the output of the press nor interfere with the rapid handling of the work in hand, as the operator can see the piece in the press at all times without having to turn his head.

The preventor is operated by a simple lever which is fulcrumed to one side of the press frame and is connected at one end with the folding gate of the device

and at the other with the clutch treadle. As soon as the operator places his foot upon the treadle, the lever controlling the operation of the gate causes it to drop in advance of the descent of the press. It is claimed that this device is so sensitive that if the operator's fingers or anything as small as  $\frac{1}{8}$  in. thick is placed under the gate, the lever will not engage the pin controlling the clutch and the press will not operate. To apply this device to presses already in use the adjustment does not have to be disturbed. The device is fastened on the press by the gib screws and there is no need to alter the clutch or the treadle for attaching it to any style of press.

### Emery Testing Machines at the Bureau of Standards

Parts of the new 2,300,000-lb. Emery testing machine are being received and erected at the Washington Laboratory of the Bureau of Standards. Two of the largest pieces of the machine recently arrived, one belonging to the scale or weighing end, the other being the main straining press at the power end. At the works of the Fore River Shipbuilding Company, Quincy, Mass., where the heavier parts of the testing machine have been fabricated, the straining press, piston and cylinder head were assembled and forwarded as one piece. The shipping weight of this piece was 22½ tons. When it reached Washington it was taken across the city on a heavy four-wheeled truck, drawn part of the distance by a team of 26 horses. On Massachusetts avenue, where rising ground was met, the number of horses was increased to 30. It was taken to the Bureau by a circuitous route to avoid one of the bridges of the city, which it was thought undesirable to strain with so great a concentrated load. This machine is being installed in the Engineering Building, one of the buildings recently erected at the Bureau, where a second and smaller Emery machine is also being placed. The latter has a capacity of 230,000 lb., or one-tenth that of the larger one.

Some of the dimensions of the larger machine are as follows: The main straining press has a diameter of 32 in. Its piston has a stem 22 in. in diameter, and a stroke of 60 in. The two screws connecting the power and the scale ends are 12 in. diameter by 49 ft. 8 in. long, 30 ft. 8 in. of each being threaded. The pitch of the thread is  $1\frac{1}{2}$  in. and the depth  $\frac{3}{4}$  in. The finished weight of these screws is about 17,800 lb. each. In the design of the machine one screw is located directly over the other, their axes being horizontal. This arrangement gives convenient access to all parts of the material under test, introducing a feature of great practical value. The center line of the machine is 44 in. above the laboratory floor. Hydraulic power will be used for operating both Emery machines. A central power plant, of three accumulators, is being installed. The dead weights used aggregate about 200,000 lb. Two 10-ton traveling cranes form a part of the equipment of the large machine and a 2-ton crane is provided for the smaller one.

These machines will be used for investigative tests on the physical properties of all classes of structural materials, in the development of physical constants and matters of detail pertaining to design and fabrication of structural shapes employed in engineering and architectural works.

The lower house of the Ohio Legislature has passed the Green workmen's compensation bill, which, it is believed, will be adopted by the Senate in practically its present form. The bill as passed is a compromise between one advocated by employers and another urged by organized labor. It provides that 90 per cent. of the fund from which awards are to be made for compensation for injuries shall be paid by employers and 10 per cent. by employees. Graded amounts of compensation are provided, the maximum amount to be allowed for injuries being \$3400. The fund is to be administered by a commission of three to be appointed by the Governor.

## Locomotive Boiler Tubes\*

### The Processes of Manufacture, with Particular Reference to Heat Treatment

BY F. N. SPELLER.†

The manufacture of charcoal iron railroad boiler tubes was described by Geo. G. Crawford in a paper on that subject read before the Western Railway Club, January, 1904. His paper represented the old processes by which charcoal iron tubes were made by the National Tube Company until about two years ago. These are now rarely, if ever, used, and have become largely a matter of metallurgical history. The tube industry owes much to the railroads for its development; in fact, the invention of lap welding may be traced to the necessity which arose on the building of George Stephenson's first locomotive for a tube which would be safer and stronger than the butt welded tube, the only one made at that time. Since Stephenson's day the manufacture of locomotive tubes has increased in quantity and quality, as the demands of railroad service became more exacting, and the whole tubular industry was no doubt favorably affected thereby.

Seamless steel tubes were introduced about 1886, and established a new strength and ductility and endurance under many conditions of service. Later on a satisfactory grade of soft steel was produced, which could be lap welded like charcoal iron, and this also has been much improved, so that we now have practically three classes of tubes for locomotive service—charcoal iron lap welded, steel lap welded and seamless steel. Charcoal iron formerly was made from a special grade of pig iron made in a small blast furnace using charcoal as fuel. The product of this furnace was charged into the refinery, where about one-half of the impurities were oxidized and fluxed away, the metal being subsequently treated in lots of 300 lb. or so in a slightly modified type of the old Catalan forge with charcoal as fuel. The use of so much charcoal has necessarily been stopped, and in many other respects the manufacture of charcoal iron for tubes has of late years been considerably modified. Of these changes we are not in a position to speak, for as it was evidently impossible for obvious reasons to continue the manufacture of charcoal iron strictly along the old lines, we

#### Abandoned the Making of Charcoal Iron Tubes

about two years ago in favor of lap welded and seamless steel, which had by that time been proved a fit substitute and in some respects decidedly superior to the older material.

You all understand, of course, that when we speak of steel in this paper it refers more to the method of manufacture than the finished product, as the steel used in the manufacture of tubes, as a matter of fact, is a purer form of iron than that made by the charcoal process, and like the older metal cannot be tempered. A special grade of Bessemer steel was at first used in the manufacture of lap welded tubes, on account of its superior welding quality, but later on had to be abandoned as under some conditions it was found to develop brittleness in the beads after the tubes had been in service some time. The substitution of basic open hearth steel low in carbon and with less than 0.05 per cent. of phosphorus and sulphur has been found after more than two years' trial to do away entirely with any tendency of this kind, and as now made there is little difficulty in securing a strong weld with this steel. Seamless and lap welded tubes are made to-day from practically the same grade of soft basic open hearth steel. Let us take up what seem to be the main points requiring attention in the locomotive tube in order that it may give the best service under modern conditions.

#### 1. Resistance to Corrosion

The manufacturer should furnish a tube in the best possible condition to withstand corrosion and pitting;

\* A paper read before the Pittsburgh Railway Club, April 28, 1911.

† Metallurgical engineer, National Tube Company, Pittsburgh, Pa.

that is, the metal should be as uniform in composition and density as it is possible to make it. Much can be done to lessen the tendency to pitting by proper attention to the making of steel and the way it is worked. We have been experimenting on this problem now for several years and have gone to considerable trouble in the matter of testing and inspection of material, and in the process used for manipulating the steel so as to produce a tube which will resist corrosion as well as iron can be made to do so, and, judging from the reports of comparative service tests which have been received, steel so made is, in this respect, at least the equal of the best charcoal iron. After all, however, the solution of this problem is largely in the hands of the user. Iron or steel will corrode in spite of anything that can be done if certain material is in solution in the water, particularly dissolved oxygen or carbonic acid. By the removal of these harmful agencies corrosion may be reduced to practically nothing. It is generally understood nowadays that water conditions have everything to do with corrosion, and the simplest solution of the problem is to treat the water, with the object of making it as harmless as possible. The development of the modern tube to withstand corrosion and the treatment of water have together practically eliminated this trouble, so that it is rarely the case that tubes fail nowadays through pitting.

#### 2. Leaking in the Flue Sheet

The construction and handling of the engine has so much to do with the trouble experienced from leaky flues that it is difficult to determine how much, if any, of the responsibility for this should be placed on the tube material. If railroad engineers will tell us what qualities are required in the tube to make it hold tight in the flue sheet, we will be glad to follow their suggestions as closely as possible. At the present time the steel tube is made as stiff as possible consistent with the best welding quality and ability to stand up successfully under expansion and beading in the tube sheet.

#### 3. Strength and Ductility of Material

The tube should be of such quality as to stand repeated tightening in the flue sheet without cracking or showing undue evidence of fatigue, nor should these weaknesses develop during the life of the flue in service. The material found best adapted to give these properties is a special grade of soft open hearth steel carrying not over 0.05 per cent. phosphorus or sulphur.

#### 4. Weldability

The quality of the metal and method of handling are equally important in safe ending. Soft steel has been found somewhat harder to weld than charcoal iron, but it has been greatly improved in this respect. The necessity for a good welding quality steel is of first consideration in making locomotive tubes so that they may be easily safe ended, and this point has received a great deal of study, especially in the manufacture of lap-welded tubes, where it is, of course, one of the first essentials to manufacture. Charcoal iron carries considerably more impurities than soft open hearth steel, and these impurities form a self-fluxing mixture which facilitates welding. Railroad specifications have been so tightly drawn on composition in some cases as to work against the production of a good quality of steel for locomotive boiler tubes by calling for unnecessarily low phosphorus and sulphur. There is now very good reason to think that a mistake has been made in this direction, and that the general welding quality of the steel would be much improved, and the steel at the same time would lose nothing in other respects, if the maximum phosphorus and sulphur limits were both raised to 0.05 per cent. With producer gas, now generally used of necessity, it is a very difficult matter to keep the average sulphur in the heat below 0.035 per cent., and in order to remove this sulphur in the open hearth furnace the steel has to be held and worked in such a way as frequently to leave it dry and difficult to weld.

#### HEAT TREATMENT.

Before the steel can be welded in practice a fluid cinder must be formed on the surfaces which are to be



united. If the metal is heated too far above the point at which this cinder should flow, it will be burned and destroyed. We endeavor to have the range of temperature between the cinder forming and burning points in the steel as wide as possible so as to assist in lap welding and give the largest margin of safety in safe ending. Considering the variety of the requirements it seems to us that the compositions of the metal should be left largely to the discretion of the manufacturer so far as is consistent with a certain specified standard of physical quality in the finished tube. We frequently go to the trouble of rephosphorizing for the purpose of improving the fluxing and welding quality of our steel.

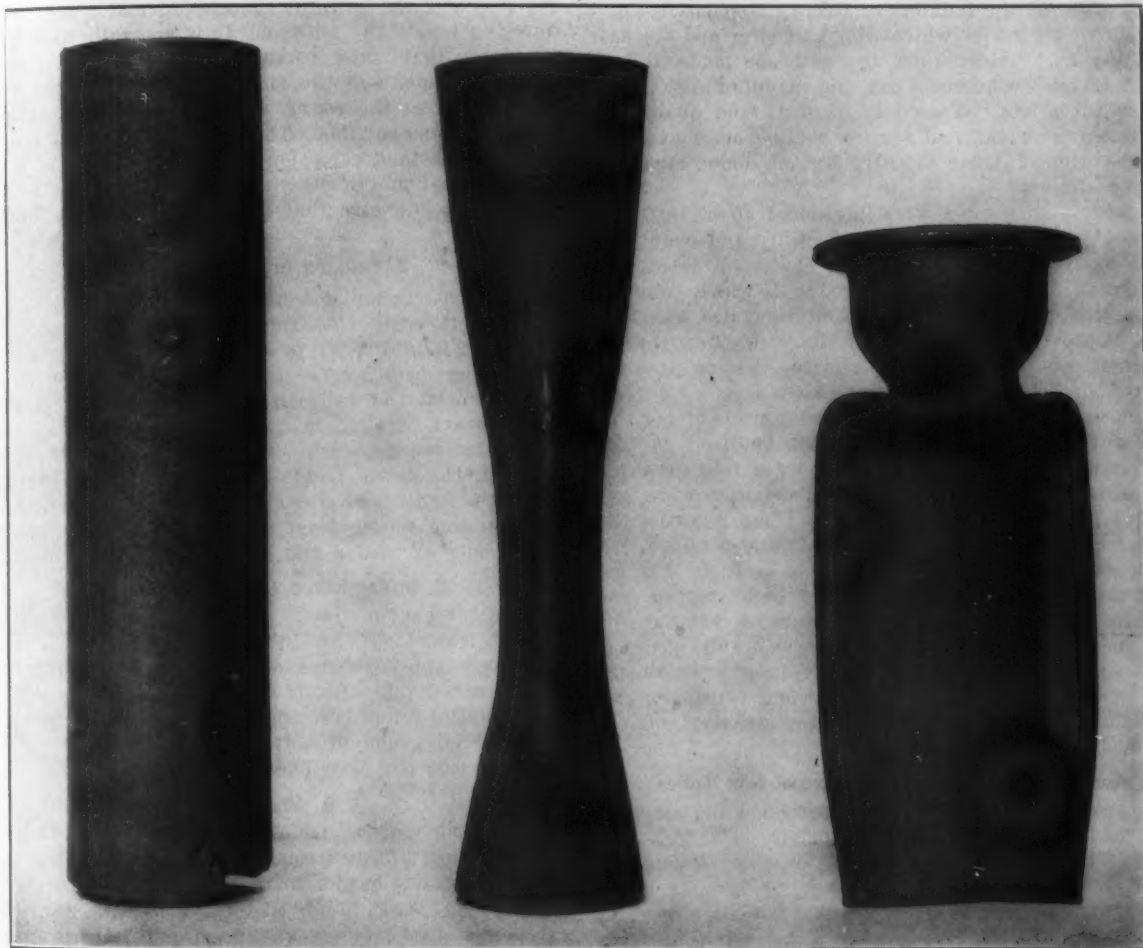
The method of safe ending, we have said, has as much to do with obtaining satisfactory results as the ma-

body tube at or near the weld. Taking unnecessary risks of this kind often explains subsequent failures which should not be charged up to the flue maker.

It is not unusual for a flue welder who has never handled steel to have trouble for a few days. Remembering the above points and using his experience to the best advantage as to the condition of his furnace, the character of the flame, temperature, &c., the average man will soon be able to do equally reliable work with steel as with charcoal iron, as the experience of welders all over the country will show.

#### 5. Uniformity of Material

This is a quality which the tubes should have in a high degree, both as to physical and chemical properties.



Flange, Crushing Down and Flattening Test for Boiler Tubes

terial, but we will not attempt to lay down specific rules as to construction of the furnace and heating, for many of the practical shop men present who are welding flues every day are much more able to discuss this side of the problem. However, there are a few broad principles on the heat treatment of tube steel which should be taken into consideration. The preliminary heating of the body tube preparatory to flaring out the end should be carried to a bright orange color judging by good shop light, 1750 degrees F. In the case of steel on steel, if the body tube is allowed to cool black after heating to this temperature and inserting the safe end, the grain structure will be refined and the metal put in much better condition for the welding operation which follows. Moreover, if the preheated body tube is returned to the furnace without cooling the metal may be crystallized or burned before the safe end has been heated hot enough to weld. Should there be any considerable difference in thickness between the safe end and body tube, it is evident that there is again a risk of overheating the one before the other is sufficiently heated to weld. If the body tube is returned to the furnace while red hot and the safe end is at the same time a gauge or two heavier, there is, of course, all the more chance of crystallizing or burning the

There is no difficulty as to the average steel tube nowadays standing the master mechanics' tests made on one sample out of each hundred tubes. We have, however, recently designed a machine to make the flange, crushing down and flattening test on each end of every tube, as shown in the illustration. This gives assurance both as to the character of the metal in each individual tube and also, in the case of lap welded tubes, as to the welding quality being satisfactory. Steel tubes are now made in one grade of material suitable for either body tube or safe ending.

The Sprague Electric Company has removed its Boston office from the Weld Building to 201 Devonshire street, where larger offices have been obtained in order to handle expeditiously the increased demand for the Sprague electric apparatus and Sprague conduit products in the New England territory.

The Bethlehem Steel Company, South Bethlehem, Pa., on April 21 turned out one of the largest crucible steel castings in its history. It weighed 11,000 lb., and required the contents of 120 pots of metal. The entire operation was effected in 14½ minutes.

## A Modern Electric Tool Factory

### The New Plant of the Hisey-Wolf Machine Company, Cincinnati, Ohio

The new plant of the Hisey-Wolf Machine Company, manufacturer of grinders and portable electric drills, at Colerain avenue and Marshall street, Cincinnati, Ohio, is attracting considerable notice, both on account of its

side of the lower floor. The floor is of concrete and cement, imbedded in which are wooden sleepers for supporting a maple floor. Cast iron columns and steel girders support the floor above.

The assembling and adjusting departments, shown in Fig. 2, occupy the second story. It is of almost identical construction as the floor below, with the exception that the maple floor is laid on 2¼-in. yellow pine flooring. The pillars in the second story, supporting the roof, are also of yellow pine. A flat composition roof, laid on



Fig. 1.—The Machine Shop on the First Floor.

construction and the unique way in which it is heated. Harry Hake designed the building and Robert S. Mayer the heating system.

The building is of semisteel construction, 75 x 175 ft., two stories. To provide ample light Detroit Fenestra

1¾-in. yellow pine sheathing, covers the building. The office occupies a front corner on the second floor, a space 20 x 45 ft. being partitioned off for this purpose. The two stairways inside the shop and at either end are inclosed with fireproof material.



Fig. 2.—A Portion of the Assembling and Adjusting Department.

Two Views in the New Plant of the Hisey-Wolf Machine Company, Cincinnati, Ohio.

steel sash windows, 12 ft. wide and extending to the ceiling, are placed in both upper and lower stories. These windows are separated by brick piers 17 in. thick and only 4 ft. wide.

Fig. 1 shows the machine shop, which occupies one

A direct current 65-hp. generator, made by the Jantze & Leist Electric Company, Cincinnati, Ohio, driven by an 85-hp. gas engine, made by the Miller Improved Gas Engine Company, Cincinnati, Ohio, furnishes the motive power for the shop.



The building is heated by a blower system, using hot water as the heating medium. The heat in the exhaust gases from the engine is utilized by passing these gases through an exhaust heater, a reverse current heater made by the Williams Tool Company, Erie, Pa., and blast coils. The water used for cooling the cylinder jacket of the engine is also circulated through this exhaust heater by a Buffalo centrifugal pump, driven by a motor made by the Reno-Kaetker Company, Cincinnati, Ohio. An auxiliary hot water boiler is provided for use in extremely cold weather or when starting up in the morning. The system is so arranged that this boiler can be used in conjunction with the hot water from the exhaust heater or separately through different sections.

It is planned to install a cooling tower for the water after it has completed the circuit of the system, so as to reduce the temperature enough to pass it back through the cylinder jacket, so that the same water can be used repeatedly for cooling the cylinders.

### The Alvey-Ferguson Company's Removal

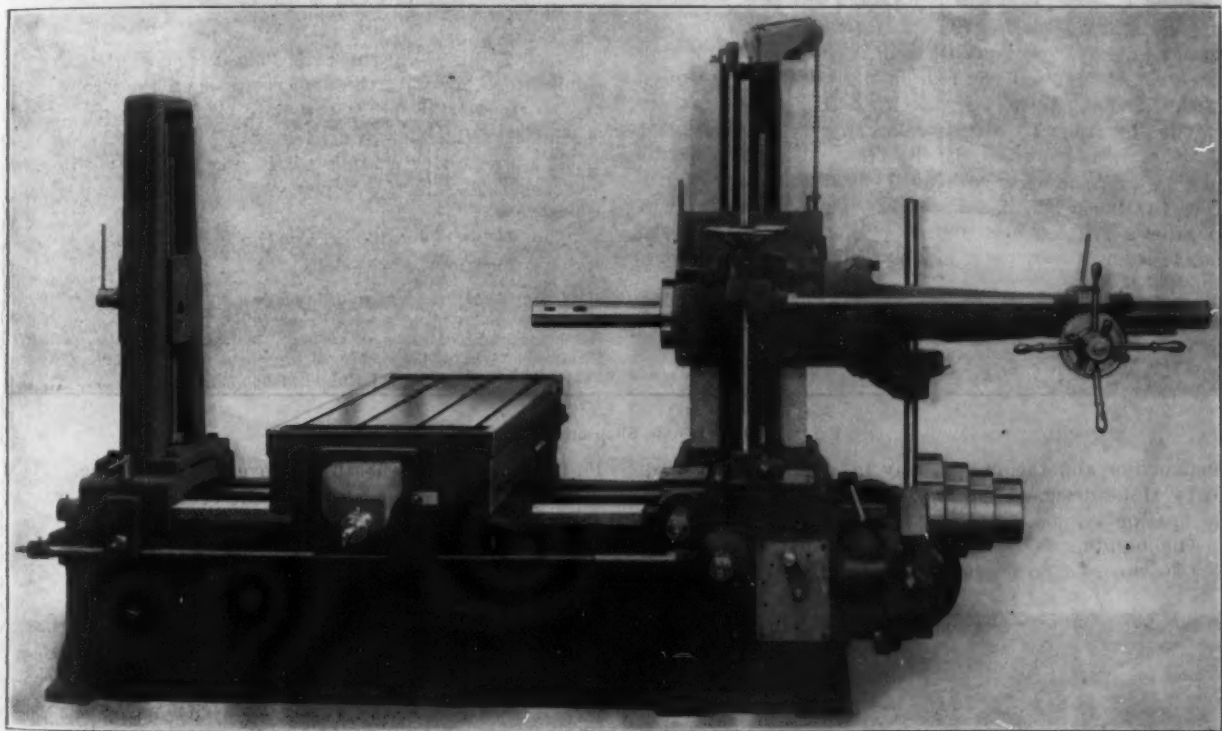
The Alvey-Ferguson Company, Louisville, Ky., manufacturer of the A-F gravity conveyers and conveying

### A Special Fosdick Horizontal Boring, Drilling and Milling Machine

For use in a shop building sugar mill machinery, where it will be subjected to severe usage, the Fosdick Machine Tool Company, Cincinnati, Ohio, has recently completed a special horizontal boring, drilling and milling machine. The machine is of the same general type as the builder's No. 0 machine, which was illustrated in *The Iron Age* April 29, 1909, but is of special interest on account of the long table and the table traverse. In this new machine the table traverse was increased to 63 in., which necessitated a redesign of the saddle and the table. A corresponding increase in the traverse of the column and outer support was made, this dimension being 27 in.

The steel gears used in the machine are of the same type as the standard tool, and all of the bearings are bronzed bushed. The machine is driven by a belt and a four-step cone pulley. Eight speed changes are available, four are secured by the cone pulley and this number is doubled by the lever on the speed box.

The construction of the saddle and the bed is very rigid. In the specifications supplied to the builder, when



A Special No. 0 Horizontal Boring, Drilling and Milling Machine Built by the Fosdick Machine Tool Company, Cincinnati, Ohio.

machinery, announces its intention of moving its plant and home offices to Oakley, Cincinnati, Ohio. A desirable five-acre site has been secured in the factory district, and the erection of modern buildings will be commenced shortly. Increased facilities, with a better access to the markets, have become necessary to take care of the large business this company is enjoying, and its capacity will be more than doubled in the new location.

The plant will include the following: Structural department, 100 x 450 ft.; woodworking department, 50 x 100 ft.; machine shop, 50 x 100 ft., and an office building, 50 x 60 ft., two stories. The construction of the factory buildings will be uniformly of steel and concrete, with saw-tooth roofs, absolutely fireproof throughout. Sprinkler systems will be installed as an additional precaution against fire. The office building, which is to be apart from the other buildings, will conform in design and construction with the main plant. The plans are in charge of the Trussed Concrete Steel Company, Detroit, Mich. This will be a model plant in every particular, and will be completed by August 1. The operation of the plant at Louisville will continue without interruption until the new one at Oakley is completed.

the table was at its maximum distance on the saddle a drop of 0.008 in. was allowed. When the machine was tested upon its completion this amount was found to be only 0.002 in.

The Beck & Corbitt Iron Company, St. Louis, Mo., heavy hardware jobber, is erecting a new six-story and basement building, 125 x 126 ft. The company at present occupies three buildings, one of five stories, 125 x 126 ft., to which two additional stories will be added, and two of two stories, 100 x 126 ft. Upon completion of the new building the company will concentrate its business, which is at present scattered in different structures, thus enabling it to handle its trade more promptly than at present and also more economically.

The plant of the Lincoln Stove & Range Company, Fremont, Ohio, has been sold to Mozart Gallup, Sandusky, Ohio, and other mortgage holders for \$139,000. Reorganization of the company is planned.

The Hawley Down Draft Furnace Company, Chicago, has reduced its capital stock from \$500,000 to \$100,000 and the number of directors from seven to three.

## The Midland 30-In. Radial Drill

A new 30-in. high speed radial drill for rapid drilling and tapping has recently been placed on the market by the Midland Machine Company, Detroit, Mich. The tool is said to possess all the advantages of the sensitive drill press combined with the large productive capacity of the radial drill and is designed for rapid jig work where the number of pieces is not large enough to warrant the use of a multiple spindle drill for tool and die work and in shops where a lighter tool than a geared radial drill is required. The machine is accurately and compactly built, occupies a small amount of floor space and is easily operated by levers within close reach of the machinist. Its special field is the handling of carbon and high speed drills having a maximum diameter of  $\frac{3}{4}$  in. and taps up to  $\frac{1}{2}$  in. in diameter at their maximum capacity. A general view of the drill is given in Fig. 1, while Fig. 2 shows the device employed for changing the feed and reversing the drill spindle.

No gears are employed in the drive or the reversing device, and the tool is driven by a 2-in. belt running at high speed, which transmits the power smoothly. Six-spindle speed changes varying from 270 to 1050 rev. per min. are available through the employment of a three-step cone pulley and the two levers shown in Fig. 2. The arrangement for reversing the spindle and for securing the three additional speeds consists of a continuous belt running around four pulleys, two on the vertical and two on the horizontal shaft. Between each pair of pulleys are clutches operated by separate levers, and the movement of either lever reverses the direction of rotation of the spindle, while moving both of them simultaneously provides the three additional speeds. The tapping lever A operates a friction clutch in the column, and the speed change lever B actuates a jaw clutch in the back shaft.

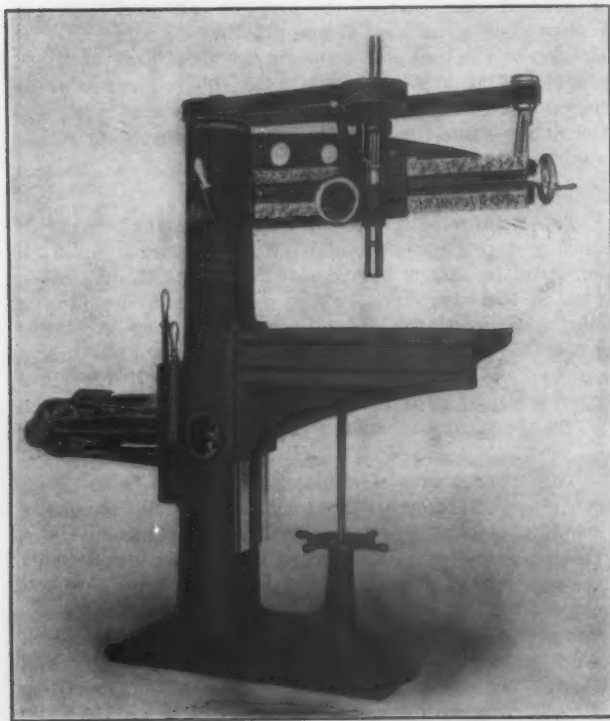


Fig. 1.—The New 30-In. High Speed Radial Drill Built by the Midland Machine Company, Detroit, Mich.

The spindle, which has dustproof ball bearings, is fed by a long feed lever with a ratchet device that automatically releases when the lever is in the upper position, while a small hand wheel controls the quick return. The spindle is of high carbon steel, has a large diameter and is accurately ground. A 2-in. endless belt that passes around two idler pulleys, one at the end of the radial arm and the other immediately back of the pulley, drives the spindle. The vertical movement of the spindle is 6 in., and that of the table 15 in., the movement of the latter being controlled by a hand wheel. The head has a move-



Fig. 2.—The Device for Changing the Feeds and Reversing the Spindle.

ment of 25 in. along the rail. The upper section of the column together with the arm revolves on the stump and can be turned through a complete circle, thus making it possible for the tool to drill over a large area. For releasing the arm or clamping it in any desired position, a lever operating in the upper part of the column is employed.

The following table gives the principal dimensions and specifications of the drill:

Maximum distance from spindle center to column, inches.....	5
Maximum distance from spindle to table, inches.....	24
Minimum height of table above floor, inches.....	27
Maximum height of table above floor, inches.....	42
Vertical movement of table, inches.....	15
Vertical movement of spindle, inches.....	6
Traverse of table on arm, inches.....	25
Number of spindle speed changes.....	6
Minimum spindle speed, revolutions per minute.....	270
Maximum spindle speed, revolutions per minute.....	1,050
Working surface top of table, inches.....	18 x 28
Working surface side of table, inches.....	6 x 28
Overall height, inches.....	74
Width of driving belt, inches.....	2
Speed of countershaft, revolutions per minute.....	305
Floor space required, inches.....	84 x 84
Total weight, pounds.....	1,250

The equipment furnished with the drill includes a set of wrenches and all the other accessories ordinarily supplied with a tool of this character.

William T. Magruder, professor of mechanical engineering, Ohio State University, Columbus, Ohio, has favored us with a copy of a 48-page pamphlet giving the itinerary of the Western inspection trip which has been taken by four instructors and 102 students of the departments of mechanical and electrical engineering of that university. The pamphlet is a model, giving many details of industries to be visited. The trip began on Sunday night, April 23, and ended Sunday morning, April 30. The party spent three days in Chicago, two days in Milwaukee and one day in Gary. The students were provided with interleaved copies of the bulletin for use in note taking. The object of trips of this character was thoroughly explained in a paper entitled "Inspection Trips," by Professor Magruder at the last meeting of the Society for the Promotion of Engineering Education.

H. J. Koontz, manufacturer's agent, Pittsburgh, has sold to the Pardoe Coal Company, Sharon, Pa., a 12 x 12 x 14 in. Ingersoll-Rand belt-driven air compressor; an Appex nipple and pipe threading machine, manufactured by the Merrill Mfg. Company, Toledo, Ohio, to the Superior Mfg. Company, Pittsburgh, and a Bliss press for pressed steel work to the P. Wall Mfg. Company, Pittsburgh.



## New Tools and Appliances

*This is essentially a news department for which information is invited.*

**Electrically Driven Pipe Cutter and Threader.**—A new design of motor driven pipe cutting and threading machine has been recently developed by the Curtis & Curtis Company, Bridgeport, Conn. The usual Forbes pattern of die cutting head having a range of 1 to 8 in. is used. This head is mounted on a cabinet base, and the motor which can be wound for any of the standard voltages and frequencies is mounted underneath. The design of the machine enables the operator to use a trolley over it for handling long and heavy lengths of pipe.

**Large Milling Machines.**—The Becker Milling Machine Company, Hyde Park, Mass., has recently brought out two new milling machines. One of these is of the vertical belt-driven type equipped with double back gears having ratios of 3 to 1 and 8 to 1 respectively. The spindle is driven by a  $\frac{5}{8}$ -in. double belt passing over a pulley 20 in. in diameter, and the open belt possesses sufficient power to take cuts in cast iron 1-16 to 3-32 in. deep with surface mills 10 and 12 in. in diameter and a table feed of 8 in. per minute. The other machine is a duplex Lincoln type miller, having spindle speeds ranging from 15 to 38½ rev. per min. The two spindle heads have independent micrometer adjustments and are driven through spur gears with a back gear ratio of 6½ to 1. Both spindles are tapered and have a No. 10 Brown & Sharpe taper hole in them. All of the driving gears are protected by guards to prevent accidents. The overall dimensions of the table are 13½ x 48 in. and the working surface is 11 x 40 in.

**Combination Screw Driver Set.**—The J. C. Barrett Company, Hartford, Conn., is manufacturing a combination steel screw driver set in which all the blades fold into the handle and are held there by a knurled sleeve at the end. A quarter-turn of the sleeve loosens the blades so that they can be ejected from the handle by a flat spring within it. In use, the force employed to drive the screw holds the blade in position.

**A New Precision Lathe.**—The Rivett Lathe Mfg. Company, Brighton, Mass., is manufacturing a new precision lathe having a device for correcting any error in the lead screw when especially accurate precision threads are being cut. This device consists of a rod journaled in bearings on the back of the lathe bed. An adjustable slide having the same general appearance as the customary taper attachment is mounted on the back of the carriage. This attachment is so connected that any movement of the carriage is transmitted to the long rod. An arm at the right end of this rod connects with the lead screw on the front of the bed and controls the correcting movement of the latter so as to compensate for any errors which it may contain or to give any slight variation in pitch that may be desired. These variations are secured by moving the slide on the carriage to the desired angle.

**Castellating Nut Fixture.**—The Hendey Machine Company, Torrington, Conn., has developed a castellating fixture for use on its Lincoln milling machines. This attachment consists of a circular plate which has been milled so as to leave projections that prevent the nuts from turning while the slots are being milled. When this work is being done the nuts are held firmly in place between the locating blocks by short cap screws which enter from the back. Three passes are necessary to finish a plateful of hexagonal nuts. Two plates are furnished with each machine, so while the miller is operating on one lot, the operator is removing the finished nuts from the other fixture and refilling it with a fresh supply. Two swinging bolts are used to hold the fixture in place, so that but little time is required to shift it from one cut to the next.

**Boring and Turning Mills.**—The Betts Machine Company, Wilmington, Del., has developed a new type of boring and turning mill which is built in sizes ranging from 5 to 30 ft. These machines are designed for heavy duty with high speed steel, and they possess several interesting

features, one of which is the use of two pinions located on either side of the base plate to drive it, an arrangement which tends toward smoother running and increased stiffness where cuts are being taken that are not continuous. Eight continuous feeds ranging from 1-64 to 1¼ in. are provided for either vertical or horizontal movement. The power rapid traverse has two speeds for vertical or horizontal movements, the fast movement being employed to bring the tool to within 2 in. of the work and the slow one to take it from this point to within 1-64 in. of the work. In addition to the operating levers generally supplied at the side of the machine, others are located on the saddle. The fine tool adjustment on the saddles is another special feature. All the guiding surfaces on the cross rail and the spindles are rectangular and are fitted with taper shoes. The tool spindles are balanced directly on the swivel by a cast iron ring sliding on a tube.

**A Motor-Driven Ferracut Press.**—A form of press which is particularly adapted for the electric motor drive has been constructed by the Ferracut Machine Company, Bridgeton, N. J. One of the prominent features of this new machine is the enlargement of the upper portion of the frame to provide a base or shelf upon which the motor can be bolted. This way of attaching the motor economizes space and eliminates the chance of possible injury to the motor or the operator, thus giving a distinct advantage over the customary method of placing the motor on a projecting shelf or on the floor. The flywheel can be belted direct to the motor, or if desired a silent chain can be used to transmit the power.

**Chip Guard.**—A chip guard intended to protect the machinist's eyes against the heated chips which fly with considerable force from the cutting point of a tool has been brought out by the Universal Stamping Company, 47 Poultny street, Buffalo, N. Y. In designing this guard provision was made to use it without interfering with the operation of the machine, and the guard proper is made of glass so that the tool post and the work are always visible. A steel frame attached to a rod held by a clamp on the tool post supports the glass, and the guard can be set at any angle while, as the rod can also be moved in any direction, a universal adjustment is secured and at the same time the guard can be moved out of the way quickly when necessary.

The Reinforced Tile Roof Company, manufacturer of reinforced cement tile roofing, which is largely used on industrial buildings, has removed its plant from Youngstown to Hubbard, Ohio, where a large main building is nearing completion. Tile will be made there the latter part of May. The company also has a plant at Wilmington, Del., to supply the Eastern market. It reports a growing demand for its product, for which the principal claims are durability, light weight and fireproof qualities.

The Fort Smith Commercial League, Inc., H. G. Spaulding, manager, Fort Smith, Ark., has issued a pamphlet entitled "Facts About Fort Smith," which gives reasons for the location of industries at that point. The pamphlet states that genuine opportunities exist for a list of enterprises named. The city now has a population of 25,000 or more, with an extensive jobbing trade and a growing number of strong manufacturing enterprises. The pamphlet sets forth the natural resources and special advantages of the locality.

The Ward Nail Company, Struthers, Ohio, has been somewhat delayed in installing its machinery, but will be ready for operations about May 15. Its output will be principally large head nails for felt roofing. The sales will be handled from Struthers, and Thomas D. Irwin, the secretary and treasurer, will have charge of this department.

The Andresen-Evans Company, manufacturer of crab buckets for handling ore, coal, crushed stone, sand and excavating, has removed its offices from 1501 Monadnock Building to 635 Railway Exchange Building, Chicago.

## Trade Publications

**Automobile Ignition.**—Bosch Magneto Company, 223 West Forty-sixth street, New York City. Pamphlet entitled "The Influence of Multi-Point Ignition on the Efficiency and Output of Internal Combustion Engines." Is a reprint of a paper presented before the Society of Automobile Engineers, January 11, 1911, and demonstrates the advantages of two-point ignition over the one-point type.

**Calendar.**—The Dexter Folder Company, 200 Fifth avenue, New York City, has issued a calendar hanger running from February 1, 1911, to January 31, 1912. The various types of printing machines are illustrated on the upper portion of the leaves for each month and a complete calendar for 1912 is given on the hanger.

**Melting Furnace.**—Rockwell Furnace Company, 26 Cortlandt street, New York City. Bulletin No. 28. Devoted to the Simplex melting furnace, which employs either oil or gas fuel for melting aluminum, brass, bronze, copper, ferromanganese, gray iron, semisteel, &c. This furnace is of the single chamber type, and it is claimed that, with proper operation, a quality of metal equal to that melted in crucibles can be produced in greater quantities without preparation and in less time at a greatly reduced cost for both fuel and labor. The construction of the furnace is briefly described and there are a number of engravings showing the furnace and some installations of it.

**Motor Trucks.**—The Seltz Automobile & Transmission Company, Detroit, Mich. Pamphlet. Devoted to the Seltz motor truck, which is built in several sizes ranging from 1500 lb. to 5 tons and propelled by a gasoline engine. The special feature of the truck is the double friction transmission system, which is said to be a very simple and effective arrangement for transmitting power from the engine to the driving wheels. The illustrations show the various types of bodies for this truck and views of the various parts.

**Electric Fans.**—Sprague Electric Company, 527 West Thirty-fourth street, New York City. Catalogue No. 323. Calls attention to the Lundell electric fans, which are made in a number of sizes and types for both alternating and direct current. The various sizes and styles of fans are all illustrated and their special features pointed out. The motors supplied with these fans are wound for all the standard voltages and frequencies.

**Steel Treatment.**—Tate, Jones & Co., Inc., Pittsburgh, Pa. Pamphlet, entitled "Heat Treatment of Steel." Is a handy reference book of formulae, expert methods and general information gleaned from practical experience along this line. After a brief introduction, the subjects of annealing, hardening and tempering are taken up and instructions given for these different processes. A list of tempering and hardening heats and a table of factors for converting the readings of the different thermometers from one scale to another complete the booklet.

**Adjustable Shaft Bearing.**—The Sauer Power Generating Company, 5115 Rosetta street, E. E., Pittsburgh, Pa. Pamphlet. Illustrates the Sauer adjustable shaft bearing, which is said to possess the advantages of reducing friction and enabling higher speeds to be used as well as heavier feeds with a corresponding increase in the output of the plant. Five types in all of bearing are made for different classes of work. All of these are illustrated, together with the various parts entering into their construction. *The Iron Age*, August 25, 1910, contained an illustrated description of these bearings.

**Condensers.**—Wheeler Condenser & Engineering Company, Carteret, N. J. Mailing card. Treats of the savings effected by operating a plant condensing instead of noncondensing and shows several typical installations of the condensers made by this company. A table giving the gain in horsepower capacity by increasing the vacuum by 1 in. for various sizes of engines operating at different piston speeds is given.

**Convertible Dump Cars.**—Ernst Wiener Company, 50 Church street, New York City. Circular. Calls attention to the Shelton convertible dump cars which this company has acquired the exclusive right to manufacture for use on narrow gauge railroads. As its name indicates, the car is one having the superstructure of a gondola, box or stock car and a flat bottom which can be converted into a hopper of the regular type. The special advantages of the car are that the usual devices for securing the doors while the cars are being loaded have been dispensed with and covering the dumping mechanism so that it does not interfere with the load in any way.

**Electric Generators.**—Triumph Electric Company, Cincinnati, Ohio. Bulletin No. 461, superseding No. 281. Covers the line of engine type direct current generators which this company builds in sizes ranging from 30 to 1000 kw. The construction of the various parts is described at length and the text is supplemented by illustrations.

**Automatic Screw Machine Work.**—National-Acme Mfg. Company, Cleveland, Ohio. Leaflet and sample of work. The piece is a cap screw with a hexagonal head and the illustrations show the operations performed in each of the four positions of the machine. Hexagonal bar stock is used and in the first position the body was milled half way and the point finished while the side tool formed the head. The milling of the body was finished as the threads were being cut by the die, and when this

was done the side tool cut the screw from the bar. This piece is offered as a typical example of the work it is possible to do on the Acme automatic multiple spindle screw machine. The simultaneous working of all the tools reduces the time required and the time for the completion of any piece is never longer than that required for the longest operation on it.

**Asphalt Floors.**—The American Asphaltum & Rubber Company, 600 Harvester Building, Chicago, Ill. Pamphlet. Deals with the use of Asphalt Mastic floors, which are water and acid proof, dustless and noiseless and can be relaid at a small cost by breaking the floor up into small pieces, adding a small amount of new asphalt and remelting. They can be used in all classes of buildings, and the engravings show floors laid in depots, industrial plants, packing houses, breweries and office buildings.

**Turbine Blowers.**—Exeter Machine Works, Exeter, N. H. Circular. Contains a report of a test made at the Boston Woven Hose Company, where one of these blowers was used to supply the forced draft.

**Traction Engines and Threshing Machinery.**—The Heilman Machine Works, Pine and First streets, Evansville, Ind. Catalogue No. 64. Treats of a line of traction engines and threshing machines and in addition illustrates self-contained, Corliss and hoisting engines and a variety of sawmills and accessories.

**Valves.**—McNab & Harlin Mfg. Company, New York City. Folder. Describes a line of outside screw and yoke valves having iron bodies and bronze stems. The exterior of the valve is shown and a line drawing illustrates its construction.

**Air Compressors.**—Sullivan Machinery Company, Chicago, Ill. Bulletin No. 58J. Devoted to the WB-2 air compressor, which is of the horizontal straight line pattern with a simple steam and two-stage air cylinders. A detailed illustrated description of the machine is given and this is followed by a table giving the dimensions and the weights of the different sizes. The advantages of two-stage compression are pointed out and a table showing the gain in the amount of power required to compress 100 cu. ft. of free air to various pressures by the two-stage process as compared with single-stage compression completes the bulletin.

**Internal Combustion Engine.**—International Harvester Company of America, Inc., Chicago, Ill. Pamphlet entitled "Engine Operator's Guide." This is the third edition of a pamphlet which is designed to place at the disposal of every engine operator and owner reliable information concerning internal combustion engine troubles. The construction, installation and adjustment of these engines is first described, followed by a list of the various kinds of trouble experienced and their remedies. Hints on the care of an engine and starting and stopping it are also given. A few illustrations of the different types of internal combustion engines made by this company complete the pamphlet.

**Sawmill and Woodworking Machinery.**—Salem Iron Works, Winston-Salem, N. C. Catalogue No. 40. This is the company's 1911 catalogue, illustrating and describing the Hustler line of sawmills, planers, matchers, molders and other woodworking machinery. In the majority of cases the illustrations and the descriptions occupy facing pages and brief tables of specifications are included.

**Car and Track Jacks.**—Templeton, Kenly & Co., Ltd. Sloan street and C. & N. W. Ry., Chicago, Ill. Catalogue No. 13. Points out the advantages of using the Simplex jack for railroad, contractors', engineers' and industrial plant work. The various types of jacks are shown and an illustrated list of repair parts with prices completes the catalogue.

Eugene Meyer, Jr., & Co., 7 Wall street, New York, have issued "A Comparative Statement of Operations" of the United States Steel Corporation, which brings up to date a booklet on the corporation's finances, issued by that firm in May 1909. The new sheet covers nine full fiscal years of the corporation's existence, excluding the nine months of 1901. The figures are so arranged as to give a complete plotting of the total business, net earnings, dividends, stock and bond issues and other details for the period named.

Henry R. Merton & Co., Ltd., London, England, report the total stock of copper in England and France on April 15 at 79,603 tons, against 82,267 tons March 31. The stocks of copper in these countries have shown a continuous decline from February 28, 1910, when they stood at 113,455 tons.

The Pittsburgh Testing Laboratory, Pittsburgh, Pa., has moved into its new five-story office and laboratory building at the corner of Seventh and Bedford avenues, where it will have more complete facilities for looking after its clients. This plant is claimed to be the largest of its kind in the country.



## The Machinery Markets

The machinery demand has improved in Cleveland, Cincinnati and on the Pacific Coast. In other machinery selling centers business is not so brisk. In Cleveland the trade is bidding on a list of 70 machines required by the American Steel & Wire Company, and the New York Central lines are asking for quotations on 10 tools. Good orders were placed there during the week and the purchases were made in lots of four or five tools. The export business is especially active in Cincinnati, where it exceeds the domestic demand. The call for second-hand machinery in that market is good. On the Pacific Coast the business is pretty thoroughly scattered, as the demand is quite general. Inquiries for logging and lumber equipment have increased, and there is a better demand for agricultural machinery and traction engines. Three small railroad lists are out in Chicago, and, while actual sales have not improved there, the market has a strong undertone. Business has fallen off in the New York market, and conditions in Philadelphia are quiet, although a better movement in second-hand equipment is reported in the latter city. In Baltimore there is an immediate demand for wood-working machinery and special machinery. The automobile manufacturers have been active in Detroit and some good sales were made for foreign accounts. New England machinery dealers and manufacturers are watching the Boston & Maine Railroad, as a list from that source is expected. Other good business is in sight there, but the immediate demand is not very brisk. Unfavorable weather conditions in the South have affected trade slightly, although electrical equipment is in fair demand there.

### New York

NEW YORK, May 3, 1911.

April was a good month for many New York machinery houses, but in most cases the month's business did not total as large as did that of March. During the last week inquiries fell off and aside from the large lists which have been mentioned in these columns during the last four weeks there was little to occupy the attention of machinery men. The list of the American Steel & Wire Company, which was issued from Cleveland, does not seem to be very generally distributed. It is judged from the tone of the inquiries that the orders will be placed in the Cleveland market, but the New York trade is bidding on the requirements for the Worcester plant, and some houses are quoting on the equipment needed for the plant at Corey, Ala. It is generally believed that the list now out will be followed by specifications for additional requirements. Most of the bids are now in for the large list of machine tools issued by the Board of Education of Yonkers, N. Y., but the trade is informed that the contracts will not be awarded until May 30. The export demand for machine tools and special automatics continues excellent. The foundry trade is quiet and several firms in this vicinity who do a foundry jobbing business report that they are operating at about 60 per cent. of their capacity. Inquiries in that line are fairly good, but buyers do not seem to want to commit themselves to the extent of placing orders for castings for delivery over any great length of time. In other words many machinery manufacturers who usually buy castings for stock are now placing orders for material for use only as they need it.

The Central Railroad of New Jersey, with main offices at 143 Liberty street, New York, whose car shops at Elizabeth were recently burned, proposes to build new shops near its present locomotive shops adjacent to the Elizabethport station. Plans are now being prepared for the structures, and it is announced that shops will be built much larger than the buildings that were burned.

The Newark Gear Cutting Machine Company, 68 Union street, Newark, N. J., is erecting a 100-ft., single story, brick extension to its factory. The floor will be of concrete covered with a wood surface. The extension will be used chiefly for assembling purposes in the manufacture of its line of gear cutting machines which the company makes a specialty of. The majority of the tools have been ordered.

Not much new mechanical equipment will be purchased for the new Sibley shops now being erected at Ithaca, N. Y., by the Cornell University. It is stated by the University authorities that the old shops are very well equipped, and the material in them will be moved to the new building when it is completed.

The Radial Reflector Company, 352 West Thirteenth street, New York, has organized a department for doing light and heavy sheet metal forming and stamping for the trade.

The Delaware, Lackawanna & Western Railroad Company is asking for bids on power equipment to be delivered to its coal mining department. The company is buying six Corliss engines with all accessories. Two engines are to

be capable of producing 250 hp. and the other four are smaller machines.

The Cattaraugus Tanning Company, Olean, N. Y., is arranging to build a two-story addition to its tannery.

The Kerr Turbine Company, Wellsville, N. Y., will soon award the contract for a one-story addition to its factory, 100 x 100 ft.

The Crescent Tool Company, Jamestown, N. Y., will build and equip a two-story addition, 50 x 132 ft., to its plant on Harrison street, and will also erect a new office building. Karl Peterson is president of the company.

The Shepard Electric Crane & Hoist Company, Montour Falls, N. Y., will soon start the construction on an addition to its factory, 76 x 130 ft., one story. Some additional machinery equipment will be required.

The Wright Health Underwear Company, Troy, N. Y., is taking bids for a four-story mill, 50 x 100 ft., which it will erect on Second avenue North.

The Ideal Furniture Company, C. W. North, manager, Jamestown, N. Y., is arranging for an addition, 55 x 68 ft., two stories, to be built at its plant, for which some new equipment will be required.

The Cleveland Worsted Mills is building at its Jamestown, N. Y., plant, located at Falconer, a power house, 60 x 140 ft., one story, and will soon arrange for its equipment.

The Weeks Scale Company, Buffalo, N. Y., is planning for the building and equipping of a new factory building about 32 x 132 ft., two stories, to meet the requirements of its increasing export trade.

The Ahlstrom Piano Company, Jamestown, N. Y., will add to its manufacturing plant on East Second street a five-story and a two-story factory building.

The Knox Gelatine Company, Johnstown, N. Y., will soon commence the erection of a four-story and basement factory building, 60 x 125 ft., to cost with equipment about \$50,000.

The Sanitary Machine Company has been incorporated at Buffalo, N. Y., with a capital stock of \$25,000 to manufacture machines for the automatic extraction of grease, fertilizer products and other by-products from city garbage and to build and operate garbage reduction plants in cities. W. D. Huntington, general manager of the Buffalo Fertilizer Company is president of the new company; Henry Thieroff, chemist and superintendent of the Buffalo Fertilizer Company, vice-president; and William H. Hotchkiss, secretary and treasurer. The offices of the company are at 62 and 64 Pearl street, Buffalo.

A special election is to be held at Olean, N. Y., this week to vote on the matter of a bond issue of \$75,000 for the construction of an electric lighting plant. John Gaynor is city engineer.

The Union Cutlery Company, Olean, N. Y., has let the contract for the erection of two additional factory buildings. W. R. Brown is president of the company.

### Catalogues Wanted

The Canadian Steel Foundries Company, Ltd., Willard, Ont., intends installing additional manufacturing equipment in its rolling mill and steel foundry. The company is organizing a local purchasing department and desires to receive catalogues on machinery and mill supplies.

The Miller-Sandy Machinery Company, Kansas City, Mo., desires catalogues of manufacturers of machine tools, boilers, engines, pumps and machinists' supplies.

## THE MACHINERY MARKETS

### Chicago

CHICAGO, ILL., May 2, 1911.

Sales in the past week have not improved, but a stronger undertone is noted in the market, and floor sales have shown an improvement in small items. While the total of the week's business has not been great, inquiries have been such that most business places of this nature have put on an encouraging busy appearance. There has been some scarcity of good second-hand machine tools in this district, and a considerable quantity has been shipped in during the past week from Cincinnati. The quietness of the past few weeks is reflected in dealers' stocks, which are quite generally trimmed down to the necessities of the day. With quiet sales it has been but natural that machinery houses should curtail their purchases, and while this policy has been somewhat hard on the manufacturers, it puts retail stocks in a healthy, clean condition not always prevalent when business is rushing. The visit of the electrical and mechanical engineering classes, with their instructors, from the Ohio State University, was an interesting feature of the week. While in this city the Ohio visitors were entertained one afternoon by the Marshall-Huschart Machinery Company in its beautifully equipped store. Practically every machine on the sample floors was operated for the benefit of the students, and the demonstrations were keenly interesting and instructive. No extremely large railroad business has developed recently, although encouragement is found in two small lists issued by the Northwestern and Rock Island railroads. The Illinois Central is also out with a list approximating \$8000.

The Tri-City Pattern & Machine Company, Moline, Ill., has changed its name to the Reynolds Pattern & Machine Company. It has increased its capital stock from \$2400 to \$30,000.

The Peoria Artificial Ice Company, Peoria, Ill., has increased its capital stock from \$15,000 to \$60,000.

The Inter-County Light & Power Company, Elmwood, Wis., is contemplating the installation of a 50-kw., single-phase, substation on the Menominee-Red Wing transmission line, stepping the voltage down directly from 33,000 volts to a 220-volt distributing system.

The Proctor Water & Light Company, Proctor, Minn., has been granted a franchise to install a water works system.

Webster City, Iowa, will hold an election on May 22 for the purpose of voting bonds in the amount of \$25,000 for the purpose of purchasing boilers, engines, machinery and electrical apparatus for the improvement, extension and general equipment of its electric light and power plant.

Bonds in the sum of \$15,000 have been issued by Gilmore City, Iowa, for the installation of a water works system.

Pierpont, S. D., has voted bonds amounting to \$3500 for new water mains.

The Faith Light & Power Company, Faith, S. D., has been granted a franchise to install an electric light and central heating plant. The plant will be a single-phase alternating current, and will cost \$10,000.

The Fort Wayne & Wabash Valley Traction Company, Fort Wayne, Ind., has under consideration the erection of new car barns and shops, definite plans for which have not been decided upon.

Owing to the efforts of a mob to tear up its railroad switches, the Seymour Mfg. Company, Seymour, Ind., is considering removing its plant, and has been in communication with the New Albany Commercial Club, New Albany, Ind., with reference to establishing itself there.

### St. Louis

ST. LOUIS, MO., May 1, 1911.

Business is very quiet here, and machinery dealers are becoming convinced that a dull summer may be expected.

The Mississippi Glass Company has placed an order for a 40-ton electric crane.

Orders have been closed for most of the equipment for a new street car manufacturing plant to be started at a point in North Carolina, which is backed by St. Louis capital.

A large new modern factory plant covering half a block for the Columbia Incandescent Lamp Company, is now nearing completion in the new factory district along the Wabash west tracks. This will be operated in addition to the present plant of the company, which will continue in service.

The Hydro Brush Mfg. Company, St. Louis, has been incorporated with a capital stock of \$50,000. The incorporators are C. Arthur Lewis, Henry W. Lewis and Edward E. Billups. The company will engage in general brush manufacturing.

The St. Louis Automobile & Engine Company, St. Louis, has been incorporated with a capital stock of \$50,000. The incorporators are W. D. Williams, Charles F. Keene and F. H. Braden.

The Modern Auto Repair & Reconstruction Company, St. Louis, has been incorporated with a capital stock of \$10,000. The incorporators are E. A. Freund, A. E. Roemmich, Charles Less and others.

The plant of the National Clock & Electric Company, St. Louis, situated at 2207 Pine street, was damaged by fire April 23, to the extent of about \$5000. The company manufactures electric clocks and thermostats. It will move to Thirteenth and Pine streets, as it had intended to do before the fire.

The American Roofing Company, Kansas City, Mo., has been incorporated with a capital stock of \$150,000. The incorporators are Robert Glendinning, John Logan and David S. Barbour.

Princeton, Mo., is considering the extension of its water works system. Improvements are also being considered for its light plant, and a new dynamo and pump will probably be installed.

Anselmo, Neb., has voted bonds in the sum of \$7000 for the installation of a water works system.

Bonds have been issued by Horton, Kan., for the purchase of the plant owned by the Horton Water & Light Company, but the plant will not be taken over until the bonds have been disposed of. A thorough investigation of the plant will be made, together with the necessary improvements.

### Cleveland

CLEVELAND, OHIO, May 2, 1911.

Business with the local machine tool dealers has improved considerably during the week. Quite a fair volume of business in small lots of from two to four or five tools came out. During the previous few weeks there was seldom an order for more than a single tool. The interest of the trade centers in the inquiry of the American Steel & Wire Company. There are about 70 machine tools on this list. The new equipment will be distributed among the various plants of the company. The New York Central Lines have a list of 10 tools for a dock shop at Ashtabula Harbor, and another list of about the same size is expected shortly for a similar shop at the same point. Some of the local manufacturers in metal working lines have just announced plans for enlarging their plants and these with other plant extensions and new plants not yet announced, all of which will require machinery equipment, make more business in prospect than at any previous time this year.

The demand for electrical equipment is quite active, a good volume of business coming from traction companies and other sources. Specifications have just come out for the electrical equipment for the new main generating plant and six substations to be built by the Northern Ohio Traction & Light Company. This company has also decided to build a hydroelectric plant near its main generating plant at Cuyahoga Falls. It is estimated that the company will spend between \$2,000,000 and \$3,000,000 in replacing its present power plants.

The New York Central Lines have issued the following list of machine tools for one of the new machine shops to be erected on the docks at Ashtabula Harbor:

- One 24-in. back geared crank shaper, motor driven.
- One 30-in. throat combination punch and shear, motor driven.
- One 32 x 56 in. swing sliding bed cap lathe, motor driven.
- One 20-in. sensitive drill press, motor driven.
- One 3-in. arm radial drill, motor driven.
- One double wheel dry drill grinder, motor driven.
- One double emery wheel, motor driven.
- One 600-lb. single frame hammer.
- One forge fire blower, motor driven.
- One 17-in. power hack saw.

Another machine shop, to be built on the Ashtabula docks, it is understood, will be erected by the Pittsburgh & Conneaut Dock Company. The list of its machinery requirements is not yet out.

The Cleveland Construction Company, 606 Citizens Building, Cleveland, has issued specifications for the electrical equipment for the main power plant to be erected by the Northern Ohio Traction & Light Company near Cuyahoga Falls, Ohio, and for equipment for six substations, to be built at various points along the line. At the main generating station there will be required two turbo generators, each 5000-kw., 3-phase, 25-cycle; two turbo exciters, each 125 kw., 125 volt; nine raising transformers; one motor generating set for lighting, three outgoing lines, 13,200 volts, 3000 kw. each; three transformers for auxiliary motors and one transformer for lighting. A large amount of equipment will also be required for the substations, including rotary converters, transformers, switchboards, &c. The traction



## THE MACHINERY MARKETS

company will also build a hydroelectric plant a short distance from its main generating plant, specifications for the equipment of which have not yet been prepared. The contract for the boilers for the main plant has been placed with the Babcock & Wilcox Company.

W. D. Sayle, president of the Cleveland Punch & Shear Works Company, Cleveland, Ohio, has purchased from W. D. Smith a controlling interest in the Ohio Machine & Tool Company, Kenton, Ohio, builder of planers and shapers. The company has been reorganized by the election of the following offices: President, W. D. Sayle; vice-president, H. W. Gramlich; secretary, H. A. Wise; treasurer, Charles C. Swift; superintendent, W. D. Smith. The capacity of the plant will be increased, and it is the plan to enlarge it considerably a little later.

The Hydraulic Pressed Steel Company, Cleveland, has let contracts for the enlargement of its plant by the erection of an extension, 80 x 140 ft., and four stories. The building will be of brick and steel construction. Considerable new machinery will be required, including presses and machine tools.

The Cleveland Foundry Company, Cleveland, Ohio, has awarded a contract to Andrew Dall & Son, Cleveland, for the erection of a six-story addition to its plant, 60 x 152 ft. It will be of steel and mill construction. It will be used for manufacturing purposes to increase its output of stoves. Specifications for the machinery requirements have not been prepared.

The Westman Motor Truck Company, Cleveland, has been incorporated with a capital stock of \$200,000, to manufacture motor trucks. The company has a temporary plant at 11,008 Sturtevant avenue, S. E. It is planning the erection of a large plant in Cleveland or elsewhere as soon as a site is decided upon. L. A. Westman is president.

The U. S. Automatic Company, Amherst, Ohio, will build a one story addition to its plant of brick and steel construction, 50 x 70 ft. with basement extending under the main building, doubling its present capacity. The company has recently increased its capital stock from \$50,000 to \$100,000. The company makes screw machine products.

Specifications for electrical equipment for the ore handling plant to be erected in Cleveland by the Pennsylvania Railroad, have been issued by George Demorest, engineer of the Pennsylvania Lines, West, Ft. Wayne, Ind. A 1000-kw. unit and some motors will be required.

Two 150 kw. generators and one 75 kw. generator will be required for the new warehouse of the Williams Edwards Company, Cleveland. The equipment will be purchased by W. S. Lougee, architect, American Trust Building.

The Brookside Machine & Repair Company, recently incorporated, has built a plant at Clark avenue and West Forty-first street, Cleveland, for the manufacture of gasoline and gas engines for motor boats.

The Tyler Furnace & Mfg. Company, Cleveland, recently incorporated with a capital stock of \$10,000, will build a plant for the manufacture of a warm air furnace. The officers are as follows: President, L. R. Dunham; vice-president, J. B. Corlett; secretary and treasurer, H. J. Probeck; general manager, E. W. Tyler.

The Board of Trustees of the Dayton State Hospital, Dayton, Ohio, will receive bids May 23 for a 250-kw. direct current generator, direct connected to slow speed Corliss engine.

The American Fork & Hoe Company, Cleveland, Ohio, has under consideration the erection of a large addition to the machine shop at its plant at Ashtabula, Ohio, but announces that the extension will not be built during the present year.

### New England

BOSTON, MASS., May 2, 1911.

The striking news of the week is the purchase by the Potter & Johnston Machine Company, Pawtucket, R. I., of a controlling interest in the business of the Windsor Machine Company, Windsor, Vt., manufacture of the Gridley turret machines. The union is a most appropriate one, the Potter & Johnston machines making with the bar machines of the Windsor Company a very complete line.

Trade is not brisk. The machinery dealers are doing some business, but they could do a great deal more. The Boston & Maine list for the Concord shops should be out very soon, and it will be a good one. Some other good business is in sight. But the general run of buyers are waiting. The banking interests find difficulty in explaining present day conditions. Money is very easy. Credits are in excellent shape, the bank men state. The effects are shown of most excellent general conditions. Following the slump of 1898 the banks took up the task of compelling a more careful development in the business of their customers, hold-

ing back credits and discouraging everything but consistent business methods. The result is that manufacturing houses are ready financially to go ahead, with ample resources, when trade shall pick up again, and develop a full market. The wire people of this section are having a first-rate business. While the demand for tonnage products is not especially brisk, the market for specialties is exceedingly good, pretty much all along the line.

The Potter & Johnston Machine Company, Pawtucket, R. I., has acquired a controlling interest in the Windsor Machine Company, Windsor, Vt. A new board of officers of the latter corporation has been elected, with James C. Potter as president, and Maxwell Evarts, Windsor, and John Johnston as vice-presidents. Mr. Potter succeeds Charles A. Moore of Manning, Maxwell & Moore, New York, who retains a stock interest in the business. George O. Gridley, designer of the Gridley automatic, the product of the Windsor Company, will continue as manager of that business. The change in ownership will have no effect upon the personnel of the two organizations, nor is it the present intention to combine the selling departments, so far as this country is concerned. But abroad the Windsor Machine Company's products will hereafter be handled by the strong selling organization, which has been built up by the Potter & Johnston Company. The two corporations will be kept intact. The affiliation is one of much importance. The Potter & Johnston Machine Company builds a line of automatic machines which handles castings and forgings of all descriptions. The Windsor Machine Company builds the Gridley automatic, which is a bar machine. Thus the combined line is very complete. Both machines are of the highest type of modern design. The shops of the companies are among the finest in the world. That at Windsor is entirely new, and contains every possible facility for the economical production of machinery. The works at Pawtucket are practically as new; a large area has been added within two years, and the equipment throughout is of the highest class.

James C. Potter of the Potter & Johnston Company, Pawtucket, R. I., and George O. Gridley, Windsor Machine Company, Windsor, Vt., have returned from a business trip in Europe.

Much importance is attached to the announcement that the New York, New Haven & Hartford Railroad has secured joint use with the New York Central of the tracks of the Boston & Albany, which covers the important territory between those cities. In the first place, the action practically eliminates competing lines in the New England territory, the Grand Trunk and Vermont Central system being practically all that is left over which the New Haven management has no control. The Boston & Maine and Maine Central systems have been virtually absorbed by the New Haven. Of great interest to the trade is the fact that the Boston & Albany will have a Boston management. If the purchasing power comes to this city the trade should benefit, though it would prefer that the purchasing agent be separated from the New Haven. However, these details have not been announced. Probably they are not yet decided.

The Writerpress Company, Inc., Buffalo, N. Y., corroborates the statement that its entire works and its offices will be removed to Shelton, Conn. The company is not yet able to give out information as to its wants in the way of equipment.

The Billings & Spencer Company, Hartford, Conn., manufacturer of drop forgings, machinists' tools and forging machinery, states that the extension of its plant at Hartford will add about 100 per cent. to the capacity of the small tool department, and will double the capacity for the shipping and storage of finished goods. The building will be 40 x 168 ft., three stories. The company will also erect a large garage on the premises. The company's new plant at Dividend, a suburb of Hartford, is not yet in operation, but will be in the near future.

The Winchester Repeating Arms Company, New Haven, Conn., will erect a new paint and storage shop, two stories, and an addition to the testing plant to be used for offices.

It is given out in Maine that the Bangor & Aroostook Railroad will begin the construction of the so-called Alagash extension this season, involving the expenditure of \$7,750,000 and 157 miles of new track. The plans call for the construction of about 100 miles of line this summer. A great area of forest land will be opened. Charter rights held by this railroad give it a through route from St. John, N. B., to Quebec, a distance of 375 miles, as compared to the 578 miles of the present established line.

A dispatch from Canaan, Conn., states that the recently incorporated Allyndale White Marble & Lime Company, Hartford, will rebuild the plant at the J. G. Batterson marble quarry, Canaan, which was burned with a loss of \$100,000 some years ago. The latest type machinery will be installed, together with large lime kilns.

The census reports of factory growth in New England cities indicate a very satisfactory increase between the years

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1904 and 1909. Worcester, a typical New England manufacturing city, with a wide variety of products, especially in metals, illustrates the increase. The number of establishments increased from 470 to 580, or 23 per cent.; the capital from \$49,000,000 to \$65,000,000, or 33 per cent.; the cost of materials used from \$27,000,000 to \$43,000,000, or 58 per cent.; the value of products from \$52,000,000 to \$77,000,000, or 48 per cent.; the value added by manufacture (products less cost of materials), from \$25,000,000 to \$35,000,000, or 37 per cent.; the average number of wage-earners employed during the year from 22,796 to 28,221, or 24 per cent., and the number of salaried officials and clerks from 2,043 to 3,383, or 56 per cent.

The Dosch Mfg. Company, Bridgeport, Conn., manufacturer of hardware specialties, will erect a factory building, 60 x 140 ft., one story and basement, of concrete blocks and reinforced concrete.

The name of the Bridgeport Forge Company, Bridgeport, Conn., has been changed to the Heppenstall Forge Company.

The round house and repair shop of the New York, New Haven & Hartford Railroad, at Danbury, Conn., were burned recently with a loss of \$50,000.

The Dwight Mfg. Company, Springfield, Mass., cotton goods, has awarded the contract for a mill building, 130 x 440 ft., six stories, to cost \$380,000. Other additions to general industry capacity include the K Mfg. Company, 165 Somerset street, Providence, R. I., factory 40 x 90 ft., two stories; Colored Worsted Company, Providence, addition to mill 25 x 98 ft., one story and basement; International Cotton Company, Killingly, Conn., re-equipping old mill throughout; R. N. Bassett Company, corsets, to add two stories to present buildings, and build in on intermediate space, doubling capacity; Vanderhoef & Co., South Norwalk, Conn., straw goods, three-story addition 40 x 60 ft., and an additional story on an existing structure; Pentucket Associates, Haverhill, Mass., eight-story brick factory building, for rental to shoe manufacturers; Rathbun Knitting Company, Woonsocket, R. I., addition to mill, 58 x 110 ft.; E. A. Mallory & Son, Danbury, Conn., addition 40 x 111 ft., two stories.

### Detroit

DETROIT, MICH., April 29, 1911.

As a whole, April was not as satisfactory a month as March. There was not nearly so large a volume of orders, and their size generally was small. The automobile trade was quite active the past week, but the majority of the sales were foreign. Building has also been quite dull this week, the total value of proposed structures being the smallest of the month. There has been a number of new concerns to perfect organizations in this city and throughout the State, but in most cases of no considerable importance. One of the biggest contracting jobs let for some time was awarded this week, this being the dredging of the Saginaw River to the bay, involving the expenditure by the Government of about \$600,000.

The Fairview Foundry Company has voted to increase its capital stock from \$100,000 to \$200,000. The company recently purchased a large site in the Fox Creek subdivision of this city, and it is understood it will enlarge the plant.

The Albert F. Pudrith Company, a manufacturing concern, has been incorporated with a capital stock of \$100,000. The plant will be located in this city.

A pattern making company, to be known as the American Pattern Works, has perfected its organization, and will start business in this city on a small basis at first, increasing its capacity as business warrants.

The plant of the Newbro Herpicide Company, maker of hair medicine, was practically destroyed by fire April 23. The burned portion will be rebuilt immediately.

The Detroit Automatic Telephone Company has filed articles of incorporation. The company has a capital stock of \$250,000, and will put on the market a telephone designed to carry sound as far as 3000 miles.

Some changes and enlargements are under way in Jackson, by the Lewis Spring & Axle Company and the Standard Electric Car Company. The former will group its several scattered plant at one central site, involving the erection of large additions. The places vacated by it will be occupied by the latter concern. Both will install considerable new equipment.

The Big Rapids Electric Company has increased its capital stock for the purpose of enlarging its operations. The former capital stock of \$35,000 has been increased to \$50,000.

W. E. Stevens, Charlevoix, Mich., has begun the erection of a large new and modern sawmill on the site of the one burned several months ago. The plant will be fully equipped.

The Duryea Automobile Company has decided to move its large plant from Reading, Pa., to Saginaw, Mich. The matter has been in the hands of the Saginaw Board of Trade for some time. The company has a capital stock of \$300,000, and will purchase buildings and six acres of land of the Brooks Boat Company.

The Big Four Railroad Company suffered the loss by fire of its roundhouse and four engines at Benton Harbor this week. The loss will reach about \$50,000.

The Buick Motor Car Company, Flint, Mich., will erect a brass foundry as an addition to its present plant.

The Williams Bros. Company, Manton, Mich., will move its factory to the city of Cadillac. The company is engaged in the last block business.

The Traverse City Canning Company, Traverse City, Mich., has been organized, and proposes to expend about \$10,000 on canning machines. L. F. Mikesell of Shelby, Mich., has the controlling interest.

Lansing butchers and meat men are to have a modern abattoir to cost about \$60,000. The plant will be equipped with machinery to make use of all the waste material. Judge Edward Cahill has the matter in hand.

The lighting plant of the village of Milan, Mich., has been sold to the Edison Power & Electric Company. Considerable improvements will be made.

The Reed City Veneer plant, which was burned some weeks ago, will be rebuilt. Sufficient capital has been subscribed to insure the project, and work will be commenced immediately. The matter is in the hands of the Commercial Club.

E. M. Barnes, an inventor of vacuum cleaners, has leased a factory building at Hastings, which he will equip for the manufacture of his product.

The Fremont Canning Company, with a plant at Fremont, Mich., is planning to move to Big Rapids. The Board of Trade at the latter city has purchased the Armour factory building for industrial purposes, to be used in connection with new enterprises.

Edward G. Lanier and I. S. Harrington, Monroe, Mich., have purchased the Waterloo Woolen Mills, and propose to make extensive additions, for the manufacture of woolen products on a large scale.

The Jones Sanitary Flusher Company of this city has changed its name to the Excello Products Company.

The Remy Electric Company of this city has made a large increase in its capital stock for the purpose of extending its business. The former capital stock has been raised from \$100,000 to \$1,000,000.

Another increase of considerable importance is the raising of the capital stock of the Grand Rapids Paper Company from \$36,000 to \$100,000. The added capital will be used for improvements.

The Harriman Mfg. Company, Chicago, will move its plant to South Haven, Mich., where new structures will be built on an enlarged scale.

The Aero-Thermol Evaporator Company of this city has been organized with a capital stock of \$10,000. H. M. Dubois has the controlling interest.

A new machinery company of this city has filed articles of incorporation, under the name of the Kerwin Machine Company. The capital stock is placed at \$100,000.

### Cincinnati

CINCINNATI, OHIO, May 2, 1911.

Manufacturers in this territory who have diligently sought export business in the past are now being rewarded. Orders for different kinds of machine tools have lately been coming in freely, and with a number of local houses the export trade is better than that from domestic customers. However, during the latter part of last week, there was some improvement in business from the domestic trade noted by almost every manufacturing firm in this vicinity. Machine tool builders, who have been neglecting the Spanish-American field, centering their energies on European and other foreign territory, recently had their attention called by A. Polhamus, Cuban consul at New Orleans, to the number of tools used in a repair shop of a sugar central in Cuba. Practically every large central not only has to keep in repair the machinery in the mill, but also a number of cars and locomotives; all of which work requires the best kind of shop equipment. The mines in Central and South America are also large users of power equipment and machine tools, and this particular field is now receiving attention.

Second-hand machinery is moving fairly well, with the demand still centered on the smaller sizes of machine tools.

The Fairbanks-Morse Company is now established in its new quarters at Eighth and Main streets, Cincinnati, and recently has acquired additional warehouse space by leasing



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part of the Broadway Building, which will be used for storage purposes only.

Smith & Mills, machine tool manufacturers, Cincinnati, are now supplying the export trade with a large number of their shapers. Recent orders received are from Europe, Australia and Japan.

The recently mentioned additions to the plant of the Portsmouth Steel Company, Portsmouth, Ohio, are nearing completion; the new sheet mill is practically finished, and is expected to be in operation about July 1.

The Patented Specialties Mfg. Company is a new incorporation in Cincinnati, with \$10,000 capital stock. It is the company's purpose to manufacture fireproof steel sash. Practically all the necessary equipment has been provided for, and the new plant will be in full operation within 30 days. Headquarters are at 1610 Reading Road. The incorporators are John A. Jones, B. L. Heidingsfeld, Alphonse Reisenburg, Frank G. Jones and Gilbert Bettman.

The new plant of the United States Electrical Tool Company, Cincinnati, is nearing completion, and the company expects to move into its new quarters about June 1. It reports export business recently as being very good, and among recent orders booked is one for 28 of its larger sized drills for a shipyard in England.

The Miami Paper Novelty Company has leased a factory building on Colerain avenue, Cincinnati, and will move into the new quarters at an early date. Very little new equipment will be needed.

The Phillemac Rolling Mill Company, Cincinnati, advises that its capital stock has been increased from \$75,000 to \$125,000 in order to take care of additions being made to its plant that will increase its daily capacity to 2200 tons of bars. All equipment has been purchased.

The American Valve & Meter Company, Cincinnati, is now moving its machinery into the new plant on Spring Grove avenue, which will be in full operation within 30 days.

The Platt Iron Works Company, Dayton, Ohio, has lately received an order from the American Cotton Oil Company for machinery to equip an oil mill that will be erected in the South.

The Rahn-Larmon Company, Cincinnati, is shipping a number of its new gap lathes to the Pacific Coast.

The Whitaker Paper Company, Cincinnati, will build a large garage on Eggleston avenue, in connection with which will be a small repair shop.

The local members of the National Association of Manufacturers will have a conference at the Sinton hotel May 8. A luncheon will be served, and among the principal subjects that will be discussed is that of the proposed Ohio employers' liability law now before the State Legislature. Thomas P. Eagan, ex-president of the association, is chairman of the Cincinnati Committee, and the following well-known manufacturers will be associated with him: Fred A. Geier, William Lodge, Harry T. Atkins, Murray Shipley and James S. Taylor. John H. Kirby, president of the association, will be the guest of honor.

H. F. Roush, of the Roush-White Foundry & Machine Company, which is to establish a plant at Stuttgart, Ark., is receiving prices on machine shop equipment at Hillsboro, Ohio, the present address of the company. The equipment includes lathes, planers, shapers, drill presses, saws, visors, &c., as well as two motors, a three-ton cupola and other foundry equipment.

### Philadelphia

PHILADELPHIA, Pa., May 1, 1911.

Continued quietness characterizes the market for both machinery and tools. Reports received from manufacturers and merchants, would appear to indicate that the volume of business transacted was even smaller than during the preceding week, and the month's total has been far from satisfactory. One or two propositions, including that of the Harrisburg Boiler & Mfg. Company, Harrisburg, Pa., for machine shop equipment, and of the Baltimore Gas Appliance & Mfg. Company, Baltimore, Md., for both foundry and general machinery equipment, are the only lists of any size before the trade, the general demand being confined to single tool propositions, while fresh inquiry for the latter class of business has not been as extensive as it was early in April. The railroad demand has been almost at a standstill, the retrenchment policy being closely followed by the roads in this district. Machine tool buying on the part of the large iron and steel interests and industrial establishments shows little promise of immediate betterment, as in many instances these plants have experienced a decline in activity. The

general consumer hesitates before placing any orders for extensive equipment, waiting until a clearer insight into the future can be had. A somewhat better movement in second-hand tool equipment is reported, a better supply of modern tools having recently come into the local market; business in second-hand equipment has, in instances, taken precedent over that for new tools. Special tool makers note an irregular demand, with but a small proportion of the orders placed coming from buyers in this immediate vicinity. Builders of power equipment, particularly boilers and engines of the smaller capacities, report a fair demand, but in few instances are plants very fully engaged. The foundry trade continues irregular.

The Pennsylvania Railroad has sent out inquiries during the week for a 12-in. grinder.

The organic Chemical Mfg. Company, 2559 Sydenham street, has had plans prepared by Guy King, architect, for a group of reinforced concrete buildings to be erected at Fort Washington, Pa. Present plans are understood to call for a building 40 x 120 ft., with a wing 32 x 34 ft. Particulars regarding equipment required are not available at this time.

The Philadelphia & Reading Railway is asking for proposals, which will be received until May 10, for further work appurtenant to the abolishing of grade crossings on the Richmond Branch Elevated. Contract No. 24 covers masonry, walls and abutments between Trenton avenue and Richmond street, while Contract No. 25 pertains to bridges, ready for ballast over Aramingo avenue, Belgrade and Thompson streets. Plans, specifications and forms for bidding are to be obtained, on payment of a deposit, refunded on return, by applying to the office of Chief Engineer W. Hunter, room 520, Reading Terminal.

Rowland Firth & Son, founders and machinists, Phillipsburg, N. J., will take bids next week for the erection and equipment of a new steel foundry, to be built on ground adjacent to their present plant. The main foundry will be 102 x 103 ft., and an adjoining building 29 x 40 ft., for the housing of the open hearth furnace. A 10-ton open hearth furnace will be installed, operated by fuel oil, and a tank of 20,000-gal. capacity will be used for storage purposes. The new plant is expected to be in operation during the coming summer.

The Mitchell & Van Meter Company, Pottstown, Pa., is planning a one-story brick addition to its plant, 40 x 84 ft. Contractors in this city are figuring on the work, but particulars are not available.

The Bureau of Surveys, City of Philadelphia, will open bids on May 9 for work on three important city bridges. These include the Chestnut Street bridge, which is to be widened, and for which previous bids were in excess of the appropriation; a bridge on the line of Springfield avenue, crossing the Philadelphia & Baltimore Central Railway, for which \$40,000 is available, and for additional work, required by the War Department, in connection with the Passunk avenue bridge. Particulars regarding these projects are to be had on application to the office of the Bureau of Surveys, City Hall.

The Receivers of the Doylestown Sewerage Company will receive sealed bids on May 5 for the reconstruction of the disposal beds at Doylestown, Pa., in accordance with plans and specifications prepared by Harrison & Schreiber, and approved by the State Department of Health. Copies of the specifications may be seen at the office of the Receivers, Hart Building, Doylestown, Pa., or at the office of the engineers, 2215 Land Title Building, Philadelphia, Pa.

It is reported that F. W. Tunnell & Co., Wheatsheaf Lane and Gaul streets, have purchased a tract of land in the vicinity of Marcus Hook, Pa., on the Delaware River below Chester, Pa., aggregating 20 acres. They manufacture fertilizers and glue, and while no particulars are available at the time, they will, it is stated, erect a large plant on the site acquired.

A. H. & F. H. Lippincott, manufacturers of soda water apparatus, have purchased the John Baird marble yard at Twenty-fourth and Locust streets and extending to the Schuylkill River, at which location they will concentrate their various plants in this city. The facilities for marble work will be enlarged and rearranged to suit their business. A four-story re-enforced concrete factory is also to be erected to accommodate the company's machine and brass shops, woodwork finishing department and fitting and other departments. Some additional equipment will ultimately be required, but the project is not sufficiently advanced to enable this matter to be considered.

The Frankford Arsenal, Frankford, Philadelphia, will take bids until May 5 for supplies to be furnished during the fiscal year ending June 30, 1912. Included among the items are steel and iron, sheet tin and zinc, pig lead and tin, iron castings, cartridge metals, electrical supplies, leather belting and laces, tools and miscellaneous articles. Information may be had from the commanding officer.

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### Baltimore

BALTIMORE, Md., May 1, 1911.

With but a few exceptions the demand for machinery and tools shows a slight falling off when compared with that in March. The same conditions are reported in general industrial lines. In a few instances plants are fairly well engaged, but it is the exception, rather than the rule, to find builders of tools, machinery or fabricators or structural work operating at normal capacity. The demand for machine tools has been somewhat scattered and merchants report but few cases where any material list of tools has been purchased. The most important project now before the trade is the equipment for the new plant of the Baltimore Gas Appliance & Mfg. Company, details of which are given later. Some little business in woodworking machinery has been transacted, while a moderate demand for special machinery is reported. Bids are being asked for work in various departments for the City Government, but little of that recently out has been of interest to the machinery trade. With the opening up of the spring season the demand for contractors' tools and equipment has been a trifle broader. Less building work of any important size has developed and fabricators of structural work are not particularly encouraged with the outlook in this immediate vicinity. Estimating is under way for some fair sized buildings in Washington, D. C., and in the South, but competition is sharp and at the present price level some of the fabricators in this district are practically out of the market. There is still considerable figuring being done on power equipment as well as heating and ventilating projects. In several cases fair orders for power plants are reported, but the major portion of the equipment taken has been the smaller horsepowers. The foundry trade is generally reported dull. Machine tool supplies have been a trifle more active, and a fair demand for some classes of second-hand machine tools is reported.

The Boston Iron & Metal Company, 305 North Holiday street, has acquired an acre of ground between First and Second streets, Highlandtown, on the Pennsylvania Railroad, where it is engaged in equipping a scrap yard, having a capacity of 75 to 100 tons a day. A frame building, 80 x 150 ft., is being erected to house the necessary machinery, which has already been purchased. The new plant will be operated in addition to the present yard at the first named location.

An addition to the heating plant of the Baltimore Bargain House, to serve one of the new sections of its warehouse, is being figured on.

The Ellicott Machine Company has taken on but little new work recently, although there is a slightly better inquiry for dredging machinery, with more in sight. The company's plant continues fairly busy on work under order.

The Board of Awards, City of Baltimore, will take proposals until May 10, for supplying the Department of the Superintendent of Lamps and Lighting with a quantity of ornamental lamp posts, in accordance with specifications to be had from Robert J. McCuen, Superintendent of the Department, City Hall.

The Pennsylvania Railroad Company has taken out permits for the erection of a fan house to be erected adjoining its station on Pennsylvania avenue. The building will be used for the installation of machinery necessary for the removal of smoke in its tunnels in this city.

John B. Adt has received several good orders for special tobacco working machinery for export. The domestic demand for similar equipment is also reported good. In elevator machinery the demand has been less active. The plant continues to be operated on full capacity.

The Montford Machine Casting Company has been closed for two weeks, pending arrangements for the sale of the plant. Hiram W. Friedenwald, proprietor, is retiring from business. The foundry has a capacity of 20 tons a day, is equipped with modern machinery and foundry equipment, and efforts will be made to sell the plant in its entirety.

Permits have been granted by the Building Inspectors' Office for the erection of a warehouse and storage building to be built for Swift & Co., 300 to 306 West Pratt street. The proposed structure is to be two stories, of brick, stone and steel, and with concrete foundations, measuring 68 x 75 ft. The B. F. Bennett Building Company is reported to have the contract for the general building work.

It is reported that the American Foundry Mfg. Company, Frederick, Md., with a capital stock of \$20,000, has been formed and will take over the business of the National Shutter Bar Company, of that city. The following officers are named: President, Charles Fisher; secretary-treasurer, James A. Brown. The new concern will, it is stated, also engage in the general foundry business.

The Crook-Kries Company, heating and ventilating engineer, is figuring on several good contracts, but reports actual orders of any material size as having been rather light during the past month. Current business has been made up of small orders of a general miscellaneous character. Considerable new work is under consideration but develops very slowly.

After several postponements the property and franchises of the Baltimore Refrigeration & Heating Company were sold at Trustees Sale on April 17. The plant is well equipped for the refrigerating, heating, cold storage and ice manufacturing business, and was bought in by the bondholders, who control a major portion of the shares of the company. No information as to the disposition the bondholders will make of the property is available, although it is stated that a reorganization and rehabilitation of the company is likely.

Proposals will be received at the office of the Governor of Maryland, Union Trust Building, this city, until May 8, for the construction of a power house and a building known as Cottage E, Women's Group, at the Springfield State Asylum, Sykesville, Md., according to plans and specifications prepared by Parker, Thomas & Rice, architects, Baltimore, Md. The buildings are to be of brick and stone, with concrete foundations. Henry Adams, Baltimore, Md., is the engineer.

Plans regarding the construction of the proposed industrial building at Preston and Clifton streets, have not yet been completed. Delays have been experienced in financing the project, which is in the nature of a public enterprise. Prominent members of the committee having the matter in charge express confidence that the proposition will be carried through.

The Chesapeake Iron Works notes a fair run of small business, but reports competition for fabricated structural work as very sharp. Business during April was about on the same basis as that for the previous month. Among others, orders taken included one for the steel work on the Bryan Estate Building, Richmond, Va., and another for the Plymouth Hall Apartments, in this city. A fair amount of inquiry is being estimated on, but the bulk of the new work offered is small in size.

The T. C. Bashor Company reports an increase in the volume of business taken, as compared with the previous month. Orders have probably not been so numerous, but have been individually larger. The boiler and tank shop is fully engaged, and a better volume of business is noted in its power equipment department. A contract has been closed with the Simpson & Doeller Company to install the electric light, heating and ventilating equipment in its new plant. An order for an engine and generator, 50 k.w. capacity, has been received from the Capitol Brewing Company, Washington, D. C., and a 125-hp. return tubular boiler, 14 x 78 ft., will be installed in the plant of the William Wilkins Company. A very fair amount of work of various classes is being figured on, and the outlook for future business is considered fairly good.

Dietrich Brothers have fully completed their new erecting shop and installed the necessary tools, and are now operating the new department at fairly good capacity. While the order for the steel work for the Baltimore Bargain House is now coming through, a number of smaller orders have been received, including the steel and ornamental work for a school in Highlandtown, and a fair amount of special work for a church building. The estimating department is busy on a considerable quantity of small work, the demand, on which the steel requirements run to any size, being rather light.

The Baltimore Bridge Company has taken orders for a fair amount of work for export. These include one for a single track, deck plate girder bridge of four spans, and 19 small I-beam span bridges for the Guatemala Railway, Guatemala, Central America. Domestic orders have not been so large. Contracts for additional buildings for the Tidewater Cement Company, Union Bridge, Md., requiring about 100 tons, are reported. Some little local viaduct work has also been taken, but there is an absence of any new projects of importance in this immediate territory.

The Baltimore Gas Appliance & Mfg. Company is making rapid progress in connection with the alterations of the buildings acquired at Bayard and Nanticoke streets, to adapt them for use as a modern plant for the manufacture of gas ranges and other gas appliances, with an ultimate capacity of 30,000 gas ranges per year. Plans under way include a complete foundry plant, as well as nickel plating, cleaning, mounting, pipe cutting and fitting, and sheet metal working departments. Electricity will be used throughout for power purpose, a battery of boilers already installed furnishing steam for various requirements. H. W. Hunter is president, D. C. Amlon, vice-president and treasurer, and Norman James, secretary, while M. W. Longfellow is the general superintendent. The company is now prepared to purchase



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the equipment for the plant, as shown by the following list, the number of each item that will be purchased being reserved. H. W. Hunter and M. W. Longfellow will have charge of the purchases:

63-in. shell cupola, 63-in. shell lined up to 40 or 45 in.  
Firebrick lining.  
Blast gate, sliding type blast gate.  
Blower, motor driven.  
Large core drying oven.  
Hand ladle shanks.  
Cast ladle bowls.  
Car trucks, pig iron coke castings.  
Flask wheelbarrow.  
Iron wheelbarrow for cupola.  
Wood wheelbarrow.  
Molders' shovels, split handle.  
Coke forks.  
No. 4 riddles, gal. wire.  
No. 8 riddles, gal. wire.  
No. 2 riddles, heavy wire.  
Butt stick.  
Tapping bars.  
Cupola picks, two designs.  
Bellows, soft leather.  
Soft brushes.  
Hard brushes.  
Floor rammers.  
Set bench hammers.  
Foundry sprinkling cans.  
Mallets, 1½ x 2½.  
Snap flasks, about six.  
Wire brushes, five-row wire.  
Heavy stove plate facing.  
Return facing.  
Fire clay.  
Molding sand.  
Core lake sand.  
Annealed core wire.  
Facing bags.  
Flask pins.  
Flask hinges.  
Flask clamps.  
Core chaplets.  
Crucibles.  
Crucible tongs.  
Cinder mill back of cupola.  
Round mills for cleaning.  
Square mills for cleaning.  
Horizontal drill lathe.  
Upright drill lathe.  
Bench vises.  
Wood patternmakers' work benches.  
Band saws.

Wood trimmer.  
Wood turning lathe.  
Large pipe threading machine.  
Pipe cutter.  
Multiple drill.  
Mixer face grinder.  
Buffalo forge drill press.  
Tapping machine, upright or horizontal.  
Small speed lathe.  
Sensitive drills.  
Large press.  
Middle size press.  
Tilting press.  
Wire straightener.  
Horseshoe press.  
Miter press notcher.  
Square shear, 60-in. blades, 16-in. gauge capacity.  
Foot power shear.  
8-ft. brake.  
3-ft. brake.  
Forming roll.  
Bar folder.  
36-in. groover.  
No. 4 bender.  
18-in. deep throat lever shears.  
No. 5 flanging machine.  
Truck for sheet iron.  
Fan and dust arrester for mills.  
No. 2 stove trucks.  
Emery stands for casting room.  
Blacksmith forge and anvil.  
Twist drill cabinet with full set of drills.  
Files, all sizes.  
Trimmo wrenches, three sizes.  
Monkey wrenches.  
Drill chucks.  
Glue.  
Glue pots.  
Grindstone.  
17-in. swing engine lathe, 3 ft. 8 in. between centers.  
Universal milling machine.  
Shaper, 20 to 24 in. stroke.  
Drill grinder.  
Electric portable grinder.  
Crimper.  
Electric welding machine.

### The South

LOUISVILLE, KY., May 2, 1911.

There is probably not as much activity in local machinery circles this week as last, though unfavorable weather is regarded as a factor in retarding sales. Manufacturers of power equipment report that the demand has fallen off somewhat, but makers of electrical machinery have booked a good volume of business. Elevators and other equipment in connection with large buildings should be an important item in this section in the next few months.

The report that the Louisville & Nashville Railroad is intending to establish shops at Frankfort, Ky., is stated by an official of the road to be based on the fact that the repair shops of the Kentucky Highland Railroad, a short line, operating between Frankfort and Versailles, Ky., which has been taken over by the Louisville & Nashville, may be somewhat enlarged in the near future. No extensive construction is contemplated.

Plans have been completed for the 18-story office building of the Inter-Southern Life Insurance Company of Louisville, which is to be erected at Fifth and Jefferson streets. Brinton B. Davis of Louisville is the architect. The building, the construction of which has been approved by the stockholders of the company, will have its own power and heating plant, and will be equipped with five electric traction elevators.

The Kentucky Electric Company, Louisville, which is planning the expenditure of \$750,000 this year on its new plant, has let the contract for its switchboards to the General Electric Company. It will purchase shortly a 50-ton crane, and will also let a contract for a 250-ft. steel stack, lined with brick and having an inside diameter of 12 ft.

McDonald & Dodd, architects for the 10-story annex of the Weissinger-Gaulbert apartment house, announce that the contracts for the construction of the building will be let shortly. Two electric elevators are provided for. The building will be of reinforced concrete.

Kester & Heck, Chicago, have been awarded the contract for the installation of the elevators in the new Tyler Hotel, Louisville.

Plans are being completed by D. X. Murphy & Bro., Louisville, for the new Louisville city hospital, which is to cost \$1,000,000. There will be five buildings, each of which will be equipped with elevators. There will be a central

power and light plant of large capacity. John H. Leathers is chairman of the Hospital Commission.

It is stated locally that the Hugh McLean Lumber Company, Buffalo, N. Y., will rebuild its sawmill, which was recently destroyed by fire at Chattanooga, Tenn., and that the new mill will be of much larger capacity than the old. It is intended to make it fireproof, and to this end steel and concrete will be used in its construction.

The George Panke Monument Company, 630 East Jefferson street, Louisville, will install a considerable amount of polishing machinery. The contract for the equipment is to be let within the next six weeks.

Peter & Melcher, Baxter avenue and Broadway, Louisville, will enlarge the capacity of their monument cutting works. Details as to the equipment to be required have not yet been decided upon.

Steam heating plants are to be installed in four Louisville public schools. Direct radiation systems will be used in two, and the fan system in the others. Sam D. Jones is business director of the board.

The Louisville Herald has completed plans for the erection of a new building at Third and Walnut streets. The equipment to be required in the new plant will include several additional individual motors, a hydraulic lift for handling paper and other supplies, and a large freight elevator to be used between the press and stereotyping departments. W. K. McKay is in charge, and Thomas & Bohne are the architects.

John C. Haswell, Marion, Ind., has purchased a site at Thirty-first street and Alford avenue, Louisville, on the tracks of the Kentucky & Indiana Terminal Railroad Company, and it is stated on good authority that the site will be used for the establishment of a malleable iron foundry, which will be erected there early in the fall. J. C. Haswell and others associated with him control the Marion Gray Iron Foundry and the Marion Malleable Iron Company, Marion, Ind., and the Gartland Foundry, Terre Haute, Ind. The excellent railroad facilities afforded locally resulted in the decision to establish the new industry here, it is announced. The plant, details of which have not been definitely worked out, will cost in the neighborhood of \$100,000 and will employ 200 men.

The Smith Cooperage Company, Louisville, is completing the installation of equipment in its electric light plant at Livermore, Ky.

The American Machine Company, Louisville, reports a good demand for elevators. It has secured contracts for the installation of four in the Starks Building, Louisville, and two to be required by the Levering Investment Company, St. Louis.

The James Clark, Jr., Electrical Company, Louisville, has secured contracts for the installation of two 350 kw. 250-volt direct current generators in the new shops of the Louisville & Nashville at Boyles, Ala., and a 200 kw. Willey engine-type generator of 200 v.p.m. capacity at the Decatur, Ala., shops of that road. It has also received an order from the Memphis Terminal Company, Memphis, Tenn., for the installation of three 187½ k.v.a. 2300-volt generators in the power house of the company.

The Fairbanks-Morse Company has had an exhibition of motor-boat engines and equipment at its Louisville branch. The motor boat field is reported to offer excellent opportunities for the sale of engines, 300 of these boats being owned in the vicinity of Louisville.

E. D. Morton & Co., Louisville, have been made Kentucky sales agents for the line of transmission machinery manufactured by the Valley Iron Works, Williamsport, Pa.

The Brandeis Machinery & Supply Company, Louisville, has been appointed sales agent for this State of the Michigan Lubricator Company, Detroit, which manufactures automatic oiling devices.

The Consolidation Coal Company, Baltimore, Md., which has begun development work on a large scale in eastern Kentucky, where it has extensive coal and timber holdings, is building a concrete dam across Elkhorn Creek, and will develop hydro-electric power.

Considerable attention is being given the efforts of J. A. Brown to establish a model city near Henderson, Ky. It is called Mortalles, and is already equipped with a power plant, while a water works plant is planned.

The Kentucky Traction & Terminal Company has been organized at Lexington, Ky., to take over the Central Kentucky Traction Company, the Lexington Railway Company, the Bluegrass Traction Company and the Lexington Utilities Company. The merger is effective May 17. The new company will erect a \$500,000 power house at Lexington as part of the plan for improving the properties.

The electric power plant of the Proctor Coal Company, Williamsburg, Ky., will be enlarged to twice its present capacity. The company plans the installation of an electrical haulway and electrically operated mining machinery.

The J. B. Burch Hexagon Boat Wheel Company has

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been organized at Bowling Green, Ky., for the manufacture of a patented hexagon boat wheel. The company has \$5000 capital stock. J. B. Burch and others are the incorporators.

Following the completion of the erection of a steel stand-pipe now under construction at Earlington, Ky., municipal authorities plan enlarging the capacity of the pumping station.

A contract will be let in the near future for the construction of a power house by the new Lincoln Institute, which is being established near Simpsonville, Ky., for the industrial education of negroes. A. E. Thompson of Berea, Ky., is in charge of the work.

The Henry Vogt Machine Company, Louisville, is in the market for two steam hammers for use in the forging department. They are to be a 600 or 800 pound and a 2000-pound hammer.

The car repair and blacksmith shops of the Tennessee, Alabama & Georgia Railroad at Alton Park, Tenn., were damaged by fire with a loss of \$7000. It is reported that the company is considering re-establishing the shops on a larger scale in another part of Alton Park.

Plans are being made at Cumberland Gap, Tenn., for the erection of a hydro-electric plant on Gap Creek for the purpose of supplying power to several manufacturers in Cumberland Gap. Arrangements may also be made by the Middlesboro Electric Company, Middlesboro, Ky., to extend its service to Cumberland Gap.

The Memphis Bridge Company, Memphis, Tenn., has been given a contract for the erection of several bridges in Shelby County by the Commissioners of the county.

C. C. Hanson, Memphis, Tenn., is planning the organization of a company to establish a cotton mill in that city.

J. L. Gorton, Winchester, Tenn., is making inquiries for prices on machinery for drilling oil wells.

The Nashville-Gallatin Railway Company has filed articles of incorporation at Nashville, Tenn., giving its capital stock as \$75,000. It will build an electric line 30 miles long. H. H. Mayberry is the principal promoter of the line.

A fire pump is to be installed in the plant of the Athens Woolen Mills, Athens, Tenn. It will have a capacity of 1000 gal. a minute.

Hogenwood, O'Daniel & Co. are planning the erection of a cotton gin of large capacity at Rutherford, Tenn.

The Rodman Lumber Company, Rodman, Fla., which is planning the erection of a big double-band sawmill, has let contracts for the boilers to the Casey-Hedges Mfg. Company, Chattanooga, Tenn. The engines will be installed by the Chattanooga Machinery Company, and the Converse Bridge Company, Chattanooga, will erect the mill building, which will be of steel and concrete.

The East Tennessee Power Company, which is building an electric power plant on the Ocoee River, will erect a sub-station at Ridgedale, Tenn., for the transformation of the power for lighting, railway and commercial use. The building and equipment will cost in the neighborhood of \$75,000. J. G. White & Co., New York, are designing plans for it.

The Kline Motor Car Company has been organized at Richmond, Va., with a capital stock of \$500,000 for the manufacture of motor cars. A two-story building, 60 x 400 ft., will be built and equipped at once. James A. Kline of York, Pa., will be the engineer and general manager of the company, which plans an annual output of 2500 cars.

The Atlanta Hydro-Electric Company, Atlanta, Ga., announces that it will begin work in the near future on its hydro-electric plant on the Toogala River, which is intended to develop 30,000 hp. The total investment is expected to reach \$3,000,000.

Tupledo, Miss., will erect a lighting plant to cost \$50,000, bonds to that amount having been voted.

The Bartlesville Machine Company, Bartlesville, Okla., has taken over the plant of the Bartlesville Machine & Foundry Company, and will erect new buildings and make extensive improvements. H. G. Durnell is manager of the concern.

The Birmingham Sanitary Bed & Mfg. Company, Birmingham, Ala., is planning the installation of machinery for the manufacture of coil bed springs.

Xavier A. Kramer, Magnolia, Miss., is engineer for the city of Bassfield, Miss., which will award a contract shortly for the erection of a complete system of waterworks.

The Motor Device Company, Helena, Ark., will manufacture a self-starting device and carbureter for use on automobiles. The concern has been incorporated with \$5000 capital stock.

A modern sawmill, with a daily capacity of 200,000 ft. of lumber, is to be erected at Laurel, Miss., by the Wausau Southern Lumber Company, Arbor Vitae, Wis. The contract for the erection of the mill has been let, and equipment, including band-saws, gang-saws, resaws and other woodworking machinery, will be purchased. W. H. Bissell, of Wausau, is president of the company, which will develop a large tract of pine timber.

The Board of Control of Norfolk, Va., will open bids May 16 for furnishing, delivering and installing two 1000 gal. per minute and one 1500 gal. per minute centrifugal sewer pumps, electrically driven, including electrical apparatus, switch board, &c.

The National Aerial Navigation & Equipment Company, Cullman, Ala., has been incorporated with \$125,000 capital stock to manufacture aeroplanes under late patents. The company is planning the erection of temporary buildings of ordinary construction in the near future and will install but little machinery.

The Hines Buggy Company, Boykins, Va., has been incorporated with \$15,000 capital stock. The company has plans for the erection of a manufacturing building, 60 x 100 ft., at an approximate cost of \$8000, and will equip it with machinery for the manufacture of carriages. The officers are W. W. White, president; R. H. Powell, vice-president, and C. T. Beaton, secretary-treasurer.

### Western Canada

WINNIPEG, MAN., April 28, 1911.

The Western Canada Power Company is making good progress in the construction of its \$3,000,000 plant at Stave River Falls, near Ruskin, B. C., 35 miles from Vancouver. Five hundred men are at work. The contracts upon which work is now proceeding are those for the construction of a \$200,000 power house, a \$100,000 receiving station, and the erection of steel towers for the transmission line along which power is to be brought to Vancouver. A trainload of generating machinery recently arrived.

The ratepayers of Burnaby, New Westminster, B. C., have approved by-laws for the expenditure of \$850,000 on public improvements. Of this sum \$350,000 is to be applied for the construction and equipment of a waterworks system.

The City Commissioner of Saskatoon, Sask., has reported in favor of the acceptance by the city of the tender of the McGougan Company, Port Arthur, Ont., to build the intercepting sewer for \$127,000; of the tender of the Lock Joint Pipe Company, New York, for reinforced concrete sewer pipe, \$137,000; of the tender of the Gartshore Thompson Pipe Company, Hamilton, for the cast iron pipe, \$13,481.

It is stated that work will be begun for the construction of the Port Arthur Wagon Works Company's plant at Port Arthur, Ont., May 1. The cost is to be \$750,000.

The Anthes Foundry Company, Toronto, has purchased a site in Winnipeg for a plant there.

Wortman & Ward, manufacturers of pumps and farm tools, Winnipeg, will extend their plant.

Tenders are called until May 15, for the supplying of six 500-kw. step-down transformers for No. 1 municipal sub-station at Winnipeg. Mr. Peterson, secretary of the Board of Trade, is to be addressed.

The contract for the power house and car sheds of the Moose Jaw Electric Railway Company, Moose Jaw, Sask., has been awarded to Navin Brothers.

An additional 10,500 hp. is being added to the generating plant of the British Columbia Electric Railway Company, Vancouver, B. C. The contract for the installation of the generator has been let to the Canadian General Electric Company, Toronto; and for the Dobil waterwheel to the John McDougall Company, Montreal.

J. C. Wallace, of the Western Dry Dock & Shipbuilding Company, Port Arthur, Ont., says that work will be begun at once on the construction there of the largest boiler plant in Canada.

The City Commissioners of Prince Albert, Sask., will receive tenders up to May 31 for a 100-hp. Cross compound engine with necessary condensing apparatus; for 600-kw., 2200-volt, 60 cycles, 3-phase engine type alternator, exciter, switchboard, automatic regulator, installed complete; for 18 x 72 in. return tubular boiler, suitable for 150 pounds working steam pressure.

The City Council of Port Arthur, Ont., is considering improvements in the municipal water works that will cost \$100,000. These would include an extension of the intake 334 ft. and a new stand pipe.

The City Council, Vancouver, B. C., has before it a proposal to install a rock crushing plant at an estimated cost of \$33,500.

The City Council of Edmonton, Alberta, has concluded to ask from the Dominion Government for an extension of time within which to decide whether or not to accept the terms for developing power at Grand Rapids several miles north of the city. The development of this water power and the building of the transmission line will cost several million dollars.



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### Eastern Canada

TORONTO, ONT., April 29, 1911.

A very notable feature in current Canadian developments is the activity in building operations. Brisk as was the building trade of 1910 in this country, it is much more so this year. According to returns published in *The Contract Record* of this city, the expenditure on new buildings in 26 leading cities of the Dominion for the first three months of the present year has been \$17,139,655, as compared with \$14,340,778 in the corresponding months of 1910. The largest increases were in Vancouver, Calgary and Montreal. Winnipeg shows a falling off from \$3,067,050 in 1910, to \$1,639,000 in 1911. It is expected, however that that city's total record for last year will be surpassed by that for this year. There are still some threatening labor troubles, but the agreeable settlement of several others is considered hopeful for the rest. One of the most serious looking is that between the workers on steel construction and their employers. A strike, which seems imminent, would cause the suspension of a lot of work. Buildings, railways and bridges now under contract are very numerous in Ontario. There is every indication that 1911 is to be a record year in railroad building in Canada. Much depends on labor. Nor is it only in the West new lines are being built. In Ontario there will be a large mileage added. As an indication of general business conditions, it may be mentioned that, although the amount of money at the disposal of Canadian enterprise was never before so great as it is to-day, the demand is exceeding the supply, especially in the West. Seeding is in an advanced state, and the crop area will be far more extensive than it was in any former year.

The Standard Ideal Company, manufacturer of enameled sanitary ware, &c., is planning extensions to its plant at Port Hope, Ont.

The Canadian Buffalo Sled Company will erect a two-story factory at Preston, Ont.

Construction is to be begun early in the summer on the extension of the union station at Quebec, Que., to cost \$750,000.

Conduits, Ltd., will build an 80 x 150 addition to its factory in Toronto.

Superintendent Glaubitz, London, Ont., has reported to the City Council that \$70,429 will be required to complete the municipal plant for the distribution of Niagara power in the city.

A municipal light and power plant will be constructed in Magog, Que., at a cost of \$100,000.

Up to June 6 tenders will be received by G. R. Geary, Mayor of Toronto; for vertical electrically driven pumps, motors and other electrical equipment, screens and cleaning apparatus, and for Venturi meters. The equipment is for drainage works. Specifications may be had from the City Engineer, Toronto, Ont.

Up to May 16 tenders will be received by James Warren, engineer, Walkerton, for the erection of a Warren truss steel bridge with a 60-ft. span.

On April 27 the works of the Canadian Car & Foundry Company at Amherst, N. S., were damaged by fire to the amount of \$150,000. The insurance on the works is nearly \$700,000.

It is reported that the C. W. Raymond Company, Dayton, Ohio, is considering the establishment in Toronto of a branch plant to manufacture clay-making machinery, the capacity of the proposed plant to be sufficient to employ 300 hands.

The ratepayers of Welland, Ont., have approved a by-law authorizing the expenditure of \$75,000 upon additions to the water works plant.

The municipal power plant in Millbrook, Ont., has been taken into the system of the Electric Power Company, Toronto, which now has a very large number of operating companies in its control. It intends to run a branch of its high-tension lines in the neighborhood of Millbrook, and install a step-down substation there.

The box factory of the Parry Sound Lumber Company, Parry Sound, Ont., was burned on Tuesday. As a consequence, over 50 hands are put out of employment.

A syndicate has been formed in London, England, to construct a railway from the Saguenay River in Quebec to Cape Charles Bay, on the east coast of Labrador, 650 miles from Quebec City.

A new forging plant, with massive hydraulic forging presses, is to be built at the New Glasgow works of the Nova Scotia Steel & Coal Company. In size, equipment and capacity, the new plant is to rival the best works of the class in Britain or Germany. More than \$500,000 will be expended on the plant. It is said that the heavy ma-

chinery for it will come from the other side of the Atlantic.

The Down Draft Furnace Company, Galt, Ont., is adding to its works, and is putting up a building, 40 x 110 ft.

The Council of Cape Breton County, Nova Scotia, has granted the recently-incorporated New Waterford Monorail Company a bonus of \$1000 a mile and exemption from taxes for five years.

E. A. Robert, president of the Canadian Light & Power Company, Montreal, has placed before the Dominion Government a plan to develop the vast power resources of the Cedar Rapids on the St. Lawrence. An outlay of from \$15,000,000 to \$20,000,000 would be involved.

Letters patent have been issued by the Dominion Government incorporating W. J. Reid & Son., Automobiles, Ltd., with a capital stock of \$100,000, and head office in London, Ont.

Commercial Engineering Corporation, Ltd., is the name of a company constituted by Dominion letters patent to do business from a head office in Toronto, and with a capital stock of \$100,000.

The same provisional directors named in the company mentioned in the preceding paragraph are incorporated as the San Antonio Land & Irrigation Company, head office in Toronto, and capital stock, \$10,000,000.

Contractors, Ltd., has been incorporated under Dominion laws with a capital stock of \$100,000, and head office at Toronto.

The Grand Metis Power Company has been incorporated under Dominion laws, with a capital stock of \$100,000, and head office at Montreal.

The Hamilton Bridge Works Company, Ltd., Hamilton, Ont., contemplates the immediate erection of an auxiliary plant on a site of about 10 acres recently purchased in the manufacturing annex in that city. Arrangements have already been made for the requisite machinery and equipment.

### The Pacific Coast

PORTLAND, ORE., April 26, 1911.

The demand continues about normal for metal working tools of the ordinary descriptions, business being of a rather scattered nature, with few single sales of more than two or three tools. No material change in the situation is anticipated, as few especially heavy tools are required here, though conditions are favorable for a gradual increase of facilities by established shops. Local machinery manufacturers report some increase in business, and the shops on Puget Sound are also well occupied. Notwithstanding the comparative quietness in the lumber trade, there is a good inquiry for logging engines and general equipment, and a number of locomotives have been purchased by logging interests in the last few weeks. The demand for sawmill machinery is only fair, being mostly for small additions to existing mills. A material increase is noted in the movement of agricultural implements, traction engines, &c., in eastern Oregon, Washington and Idaho, and manufacturers of such articles are having a very busy season. Inquiry for road machinery is increasing, and some business is coming out in heavy equipment for railroad contractors, &c. Considerable business from Alaska is being booked by local and Puget Sound concerns, principally in mining machinery and sawmill equipment.

Rapid progress is being made on the addition to the Washington Iron Works plant, Seattle, Wash. According to the plans, the foundry will be the largest on the north Pacific Coast. Three cupolas will be installed, with a capacity of 40 tons daily, in addition to a 5-ton steel casting plant and a brass foundry. A 15-ton traveling crane and three 10-ton electric jib-crane will be installed.

The Multa Machine Company has been incorporated at Albany, Ore., with a capital stock of \$10,000, by M. Stein, T. Slate and W. A. Slate. The company will install a small shop for the manufacture of a stump-puller patented by T. Slate.

The Washington Steel & Iron Company expects to start its plant at Leavenworth, Wash., about the end of the month. Officers of the Pacific Fruit Express Company announce that they will erect a number of ice plants in Oregon this year.

The commissioners of Pierce County, Wash., will receive bids May 6 for a steam engine and electric generating unit.

M. F. Loosley is planning to establish a new sawmill near Klamath Falls, Ore.

A shipment of mining machinery, amounting to about 300 tons, was dispatched the first of the week from Seattle, Wash., for the Treadwell mine at Douglas Island, Alaska.

The Commissioners of Whatcom County, Wash., are figuring on a lot of modern road machinery, which will be purchased in the near future.

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The town of Chehalis, Wash., is planning to install an electric hoist at the municipal rock bunkers.

The A. J. West Lumber Company, Aberdeen, Wash., whose mill was destroyed in February, has let contracts for the erection of a new plant.

The Star Machinery Company, Seattle, Wash., has recently shipped considerable machinery to Alaska, including a complete sawmill outfit to the Treadwell mine, and a donkey engine to the Yakutat & Southern Railroad.

A contract has just been let for a 650-ft. tunnel for the Chicago, Milwaukee & Puget Sound Railroad at Spokane, Wash. This is the beginning of construction work to be carried out at that point at an estimated cost of about \$2,500,000.

The Great Southern Railroad, now operating a line from The Dalles to Dufur, Ore., is taking figures on an extension of 40 miles to Juniper Flats.

Contracts have been let for the new mill of the Harding Lumber Company, Lindberg, Wash. The plant will include two large boilers, three steam engines, circular saws, &c., and two shingle machines.

The Hope Lumber Company, Lewiston, Idaho, is installing a lot of new machinery, including four boilers and engines with a total capacity of 600 hp.

The Standard Silver & Lead Mining Company, Silverton, B. C., has placed a contract for a concentrator plant, amounting to about \$30,000, with Chalmers & Williams of Chicago.

The machinery and concentrator of the Baker City, Ore., sampling works of the Oregon-Idaho Investment Company, which were destroyed by fire early this month, are to be replaced as soon as possible.

The town of Wenatchee, Wash., is in the market for a pumping outfit for the municipal water works.

The Canyon Mountain Mining Company is preparing to add a 2-stamp mill to its mine near Canyon City, Ore.

The Simonds Mfg. Company has installed at Seattle, Wash., a complete band-saw filing and fitting shop, capable of handling saws of any width.

The Plumas Power Company is planning to erect several hydro-electric power plants in Plumas County, Cal.

The Tilden & Eakle Lumber Company, Richmond, Cal., is installing a complete blower system in its planing mill.

Los Angeles County, Cal., will soon be in the market for a steam shovel, to be used in connection with the county rock quarry.

It is reported that the Automatic Electric Company of Chicago is contemplating the establishment of a factory at Spokane, Wash.

The Geo. E. Dow Pumping Engine Company, San Francisco, Cal., is building a 12 x 20 x 12-in. simplex steam driven air compressor for the Plumas Amalgamated Mines Company. The compressor will have a capacity of 500 cu. ft. per minute against 15 lbs. pressure, and is intended for cyanide agitation.

The San Pablo Ice & Cold Storage Company is planning to establish a new ice plant at Richmond, Cal.

Crescent City, Cal., has placed an order with the A. L. Young Machinery Company, San Francisco, for a rock crusher.

At the annual meeting of the Pacific Coast Machinery Dealers' Association at San Francisco, Cal., April 22, the following officers were elected for the ensuing year: President, A. L. Young of the A. L. Young Machinery Company, succeeding Chas. Stallman; vice-president, Alexander Hamilton of Baker & Hamilton; secretary-treasurer, H. H. Tracy of the Tracy Engineering Company. The association has under discussion a plan for incorporation.

At the recent meeting of the creditors of Henshaw, Bulkley & Co., San Francisco, Cal., arrangements were made whereby the company is granted an extension of time to meet its liabilities, as an investigation showed that the company was solvent and only temporarily embarrassed.

A water works system will be installed at the State Insane Hospital, Sedro-Woolley, Wash., at an estimated cost of \$20,000.

A resolution is before the City Council of Pasco, Wash., to the effect that the city issue bonds in the sum of \$50,000 for the purpose of purchasing the plant of the Pacific Power & Light Company. Of this amount it is proposed to use \$20,000 for improvements.

### Texas

AUSTIN, TEXAS, April 29, 1911.

Excessive rains are reported from some parts of the State, and crop prospects are being somewhat impaired. It is thought, however, that the present unsatisfactory conditions will be speedily remedied by a period of brighter weather and that it will be a record-breaking crop year for Texas. Irrigation has not been necessary in any part of the

State so far this season, and this fact is lessening the demand for irrigation pumping machinery. With the settlement of the revolutionary troubles in Mexico a big revival of business of all lines in that country is expected to take place. Many industrial projects that will require American machinery are in contemplation as soon as order is restored.

The South Texas Engineering & Construction Company, San Antonio, is negotiating with the Business Men's Club of Kerrville, Texas, looking to the construction of a complete system of sewers for that town.

Authoritative announcement is made by John G. Willacy, Corpus Christi, business representative of Charles P. Taft, Cincinnati, that the latter has approved plans for about \$600,000 worth of improvements that are to be made upon his ranch in South Texas. Most of this sum will be spent in the installation of public utility works and other improvements in the town of Portland, which is situated upon the ranch. An electric light and power plant, a water works plant and distributing system and a number of other large industrial enterprises will be established there. The water for the proposed distributing system will be brought from artesian wells, a distance of eight miles. A deep water harbor will be created in Corpus Christi Bay near the town and wharves and other port facilities constructed. While the appropriation for the improvements that are to be made this year amounts to \$600,000, it is announced that more than \$2,000,000 will have been expended before the plans for improving and developing the big ranch and town properties are rounded out.

The Freear-Brin Furniture Company has begun the erection of the building for its furniture factory at Wichita Falls. The plant will cost about \$15,000.

The J. T. Cogan Company, New York, has submitted a proposition to the City Council of Austin to rebuild the dam across the Colorado River and to install a hydroelectric plant. The proposed improvement is to cost \$1,000,000, which shall be paid by the city at the rate of \$50,000 per annum from the earnings of the water works and electric light and power departments. The proposition along with others having the same object in view will be referred to the people at an election that will be called in the near future.

The Chamber of Commerce, of Wichita Falls, is negotiating with capitalists of Milwaukee, Wis., for the establishment of a plant for the manufacture of small dynamos and electrical appliances. The proposed company will have a capital stock of \$75,000.

Gordon Hill, Harlingen, Texas, will install a cotton-seed oil mill and cotton gin at that place.

The electric light and power plant at Troup, Texas, has been purchased by R. C. Shumate, Zephyr, from Clark Finch. Under the new management improvements and extensions will be made.

The Fort Stockton Land & Irrigation Company, Fort Stockton, is arranging to extend its canal system and to construct additional water storage reservoirs to bring under cultivation about 30,000 more acres of land.

The Toyah & Pecos Lake Irrigation Company, which has been organized with a capital stock of \$1,500,000, will construct large water storage reservoirs at the base of the Davis Mountains in Western Texas, and bring about the irrigation of about 60,000 acres of land in the Toyah Creek valley. The company's offices are at Pecos.

The Willard Naval Stores Company is installing large turpentine and rosin works near Livingston.

The Texas City Transportation Company has arranged for the installation of electric carriers in its warehouse C, which is devoted to New York business at Texas City. If these carriers prove satisfactory, it is the intention of the company to equip all of its warehouses with them. The company will also equip its pier with electric cranes to handle cotton and miscellaneous freight. It will install machine shops for the repair of its equipment. The shops will be operated by electricity.

Oscar Pacius, Monterey, Mexico, and associates have organized the Continental Wax Company with offices at Alpine, Texas, and it is announced that instead of installing one factory for the manufacture of wax from the candleilla weed as was originally planned it has been decided by the company to put up 10 such factories in different localities of Western Texas, where the weed grows profusely. The company has a capital stock of \$500,000, which sum will be invested in the erection and equipment of the factories. It claims to have already contracted for 5,000,000 tons of the weed.

Preliminary steps have been taken at Morgan City, La., to install a water works plant and distributing system. It will cost about \$60,000.

The Magnolia Petroleum Company has been organized as a joint stock association with offices at Galveston, for the purpose of taking over and operating the two large oil



refineries of John Sealy & Co., of that place. One of these refineries is at Beaumont and the other at Corsicana. They will be enlarged and otherwise improved. John Sealy is president of the new company.

James Artwin, Chihuahua, Mexico, has applied to the Government of that state for a concession to erect a smelter at Huisopa, district of Guerrero. He will invest about \$25,000 in the plant.

The Progressive broom factory at Tucumcari, N. M., owned by E. H. Fulwood and associates, will be enlarged. A number of new winding machines will be installed.

The Texas Handle Company has been organized at Houston with a capital stock of \$25,000. The incorporators are C. B. McClamroch, E. J. Gear and E. L. Gear.

The Calloway Coal & Sand Company has been organized at Houston with a capital stock of \$25,000. The incorporators are W. P. Callaway, Harry J. Hatch and Charles B. Hatch.

The Richardson Construction Company, Los Angeles, Cal., is making surveys on the Bavispe and Yaqui rivers, in the state of Sonora, Mexico, for its proposed dam and irrigation system and hydroelectric plant. The site for one of the dams and reservoirs has been located at Angustoria on the Bavispe River. The dam will be constructed across a narrow canyon and will have a width of only 100 ft. and will be 180 ft. high. The water will be conveyed in canals to the valley of the Yaqui River, where the company owns about 1,500,000 acres of land. The hydroelectric plant will be of large capacity and will afford power for the mines and other industries in a broad scope of territory.

## Government Purchases

WASHINGTON, D. C., May 1, 1911.

The Bureau of Supplies and Accounts, Navy Department, Washington, will open bids May 13 for electric lighting machinery and accessories, including one 12-kw. gasoline engine belted generating set, 200-ampere-hour storage battery, wiring material, &c., for the United States Marine Corps Rifle Range, Winthrop, Md.

The United States Reclamation Service, Los Angeles, Cal., will open bids May 15 for furnishing a steam power plant for the Rio Grande project, New Mexico-Texas, including the following equipment:

Two 625 K. V. A. turbo-generators, two steam turbine driven excitors, two horizontal surface condensers with turbine driven pump, one horizontal surface condenser with turbine driven pump, two horizontal surface condensers with engine driven pumps, three 250-hp. water tube boilers, two duplex boiler feed pumps, one open feed water heater, and the installation of one additional turbo-generator, one generator panel, one condenser and one boiler with necessary piping complete.

The Commissioners of the District of Columbia, Washington, opened bids April 25 for furnishing two steam engines and two generators for use in the McKinley Manual Training School as follows:

National Electrical Supply Company, Washington, D. C., \$2050 for generators; Western Electric Company, New York, \$2220 alternate; \$2036 for generators; Garwood Electric Company, Garwood, N. J., \$2168 for generators; Harrisburg Foundry & Machine Works, Harrisburg, Pa., \$2580 for generators; B. F. Sturtevant Company, Hyde Park, Mass., \$6675 for engines and generators; Mackay Engineering Company, Baltimore, Md., \$4600 for engines and generators; A. D. Granger Company, New York, \$5514 for engines and generators, \$5370 alternate; Shepherd Engineering Company, Williamsport, Pa., \$2248 for engines; Aills-Chalmers Company, Milwaukee, Wis., \$2850 and \$2185 for generators; Thomas E. Bashor, Baltimore, Md., \$4571 for engines and generators; Ames Iron Works, Baltimore, Md., \$2797 for engines; Burke Electric Company, Erie, Pa., \$2100 for generators, \$2300 alternate; Standard Engineering Company, Washington, D. C., \$2210 for generators, \$2830 alternate.

The Bureau of Supplies and Accounts, Navy Department, Washington, opened bids April 25 for material and supplies for Charleston, as follows:

Class 51.—For furnishing and erecting complete one 20-ton electric crane—Bidder 20, Alfred Box & Co., Philadelphia, Pa., \$4744; 36, Cleveland Crane & Engine Company, Wickliff, Ohio, \$5723; 93, Manning, Maxwell & Moore, New York, \$6035; 94, Morgan Engineering Company, Alliance, Ohio, \$6595; 104, Niles-Bement-Pond Company, New York, \$5195, \$8800; 105, Northern Engineering Works, Detroit, Mich., \$5975; 153, Whiting Foundry Equipment Company, Harvey, Ill., \$6000.

Class 52.—For furnishing and erecting complete one 20-ton electric traveling crane—Bidder 20, Alfred Box & Co., Philadelphia, Pa., \$3286; 36, Cleveland Crane & Engine Company, Wickliff, Ohio, \$3843; 93, Manning, Maxwell & Moore, New York, \$4448; 94, Morgan Engineering Company, Alliance, Ohio, \$4775; 104, Niles-Bement-Pond Company, New York, \$3875, \$8800; 105, Northern Engineering Works, Detroit, Mich., \$4080; 153, Whiting Foundry Equipment Company, Harvey, Ill., \$4300.

Class 53.—One double back geared engine lathe—Bidder 12, American Tool Works, Cincinnati, Ohio, \$2961 and \$3081; 54, Fairbanks Company, Washington, D. C., \$2936; 55, Frevort Machinery Company, New York, \$2512; 63, Griscom-Spencer Company, New York, \$2765; 77, I. R. Johnson, Jr., Company, Philadelphia, Pa., \$2701; 78, J. P. Kemp, Baltimore, Md., \$3115; 82, R. K. LeBlond Machine Tool Company, Cincinnati, Ohio, \$3221.25; 93, Manning, Maxwell & Moore, New York, \$3000, \$3167 and \$3265; 104, Niles-Bement-Pond Company, New York, \$2850.

Class 55.—One horizontal boring and drilling machine—Bidder 54, Fairbanks Company, Washington, D. C., \$1995; 55, Lucas Machine Tool Company, Cleveland, Ohio, \$2115 and \$1140; 104, Niles-Bement-Pond Company, New York, \$1395; 112, Prentiss Tool & Supply Company, New York, \$1323, \$1358, \$1389, \$1473, \$1458 and \$1499.

Class 56.—One boring and turning mill—Bidder 61, Gisholt Machine Company, New York, \$3585; 78, J. P. Kemp, Baltimore, Md., \$2700; 93, Manning, Maxwell & Moore, New York, \$3045, \$3075 and \$3075; 104, Niles-Bement-Pond Company, New York, \$2340; 159, Bullard Machine Tool Company, Bridgeport, Conn., \$2765.

Class 57.—One 5-ft. full universal radial drill—Bidder 12, American Tool Works, Cincinnati, Ohio, \$1186, \$1937 and \$2012; 54, Fairbanks Company, Washington, D. C., \$817; 55, Frevort Machinery Company, New York, \$2045; 63, Griscom-Spencer Company, New York, \$1833; 78, J. P. Kemp, Baltimore, Md., \$2070; 93, Manning, Maxwell & Moore, New York, \$2699; 104, Niles-Bement-Pond Company, New York, \$1395.

## The Pittsburgh Foundry Convention

The Registration Committee of the association advises members that the registration at the Pittsburgh convention will be conducted in much the same manner as last year at Detroit. To expedite the registration and facilitate the work at the counter, the following requests are made:

1. That each person registering will do so according to the name in which the membership stands; for instance, if John Jones is representing John Brown & Co., who are members of the A. F. A. or A. B. F. A., he will go to the alphabetical division B, where he will present his card, saying that John Brown & Co. are members of either or both associations, and he will register as John Jones of John Brown & Co.

The members of the Associated Foundry Foremen will, of course, register individually in the proper alphabetical division.

2. It is also requested, when convenient, that those registering will present their business card, bearing their own name and firm name, thus making sure that the names will be recorded correctly.

With these advance hints, it is hoped to make the registration an ideal one for all concerned.

The Mumford Molding Machine Company, Plainfield, N. J., furnishes the following list of the machines it expects to exhibit at the convention: Split pattern power ramming machine, with vibrator 12 in.; plain squeezer, with match plate roll-over mechanism; 10-in. high trunnion squeezer, with match plate and vibrator; 10-in. plain jolt ramming machine, with new style valve; 3-in. plain jolt ramming machine, also with new style valve, and section of this machine showing in full detail the new valve arrangement.

**The Pittsburgh Foundrymen's Association.**—The regular monthly meeting of the Pittsburgh Foundrymen's Association was held in the Fort Pitt Hotel, Pittsburgh, on the evening of May 1, preceded by a dinner. Dr. Richard Moldenke, secretary of the American Foundrymen's Association, made an address on the subject of "Modern Cupola Methods." The chairmen of the various committees appointed some time ago to make arrangements for the entertainment of the members of the American Foundrymen's Association at the convention to be held in Pittsburgh, commencing May 23, presented their reports; all indications point to a very successful meeting. The Pittsburgh Foundrymen's Association has rounded out 15 years of existence, and F. H. Zimmers of the Union Foundry & Machine Company, Pittsburgh, has served the association as secretary in a very efficient manner since its organization.

**The Commercial Engineers' Association.**—There has been organized in Chicago the Commercial Engineers' Association, composed of local representatives of manufacturers of machinery and mechanical devices. The purpose of the organization is solely one of self-help, combining an exchange of ideas and advance information with reference to new business. The officers are as follows: President, C. W. Aveling, Continental Bridge Company, Peotone, Ill.; vice-president, A. J. Reed, Cuthbert Electrical Mfg. Company, Chicago; secretary and treasurer, A. Engleman, Electric Controller & Mfg. Company. The Committee on Membership is as follows: Wm. M. Conley, Chicago, district manager of the Electric Controller & Mfg. Company; H. L. Musser, McMyler-Interstate Company, and A. G. A. Schmidt, National Equipment Company, Chicago.

# CURRENT METAL PRICES.

The following quotations are for small lots, New York. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market report.

IRON AND STEEL—		Genuine Iron Sheets—		METALS—	
Bar Iron from store—		Galvanized.		Tin—	
Refined Iron:		Nos. 22 and 24.....		Straits Pig.....	
1 to 1 1/4 in. round and square.....		No. 26.....		Copper—	
1 1/4 to 4 in. x 1/4 to 1 in.....		No. 28.....		Lake Ingot.....	
1 1/2 to 4 in. x 1/4 to 3-1.....		Corrugated Roofing—		Electrolytic.....	
Rods—3/8 and 11-16 round and square.....		2 1/2 in. corrugated.....		Castings.....	
Angles:		No. 24.....		Spelter—	
3 in. x 1/4 in. and larger.....		No. 26.....		Western.....	
3 in. x 3-16 in. and 1/2 in.....		No. 28.....		Zinc.	
1 1/2 to 2 1/2 in. x 1/4 in.....		Tin Plates—		No. 9, base, casks.....	
1 1/2 to 2 1/2 in. x 3-16 in. and thicker.....		American Charcoal Plates (per box.)		Lead.	
1 to 1 1/4 in. x 1/4 in.....		"A.A.A." Charcoal:		American Pig.....	
1 to 1 1/4 in. x 1/4 in.....		IC, 14 x 20.....		Bar.....	
1 to 1 1/4 in. x 1/4 in.....		IX, 14 x 20.....		Solder.	
1 to 1 1/4 in. x 1/4 in.....		A. Charcoal:		1/2 & 3/4, guaranteed.....	
1 to 1 1/4 in. x 1/4 in.....		IC, 14 x 20.....		No. 1.....	
1 to 1 1/4 in. x 1/4 in.....		IX, 14 x 20.....		Refined.....	
1 to 1 1/4 in. x 1/4 in.....		American Coke Plates—Bessemer—		Prices of Solder indicated by private brand vary	
1 to 1 1/4 in. x 1/4 in.....		IC, 14 x 20.....		according to composition.	
1 to 1 1/4 in. x 1/4 in.....		IX, 14 x 20.....		Antimony—	
1 to 1 1/4 in. x 1/4 in.....		American Terne Plates—		Cookson.....	
1 to 1 1/4 in. x 1/4 in.....		IC, 20 x 28 with an 8 lb. coating.....		Hallett.....	
1 to 1 1/4 in. x 1/4 in.....		IX, 20 x 28 with an 8 lb. coating.....		Other Brands.....	
1 to 1 1/4 in. x 1/4 in.....		Seamless Brass Tubes—		Per. lb.	
1 to 1 1/4 in. x 1/4 in.....		List November 15, 1908.....		Bismuth—	
1 to 1 1/4 in. x 1/4 in.....		Base price 18¢		Aluminum—	
1 to 1 1/4 in. x 1/4 in.....		Brass Tubes, Iron Pipe Sizes—		No. 1 Aluminum (guaranteed over 99% pure), in bars	
1 to 1 1/4 in. x 1/4 in.....		List November 15, 1908.....		for remelting.....	
1 to 1 1/4 in. x 1/4 in.....		Base price 19¢		Rods & Wire.....	
1 to 1 1/4 in. x 1/4 in.....		Copper Tubes—		Base Price	
1 to 1 1/4 in. x 1/4 in.....		List November 13, 1908.....		Old Metals.	
1 to 1 1/4 in. x 1/4 in.....		Base price 21¢		Dealers' Purchasing Prices Paid in New York	
1 to 1 1/4 in. x 1/4 in.....		Brazed Brass Tubes—		Copper, Heavy cut and crucible.....	
1 to 1 1/4 in. x 1/4 in.....		List February 1, 1911.....		Copper, Heavy and Wire.....	
1 to 1 1/4 in. x 1/4 in.....		19¢ per lb.		Copper, Light and Bottoms.....	
1 to 1 1/4 in. x 1/4 in.....		High Brass Rods—		Brass, Heavy.....	
1 to 1 1/4 in. x 1/4 in.....		List February 1, 1911.....		Brass, Light.....	
1 to 1 1/4 in. x 1/4 in.....		14 1/2¢ per lb.		Heavy Machine Composition.....	
1 to 1 1/4 in. x 1/4 in.....		Roll and Sheet Brass—		Clean Brass Turnings.....	
1 to 1 1/4 in. x 1/4 in.....		List February 1, 1911.....		Composition Turnings.....	
1 to 1 1/4 in. x 1/4 in.....		14 1/2¢ per lb.		Lead, Heavy.....	
1 to 1 1/4 in. x 1/4 in.....		Brass Wire—		Lead, Tea.....	
1 to 1 1/4 in. x 1/4 in.....		List February 1, 1911.....		Zinc Scrap.....	
1 to 1 1/4 in. x 1/4 in.....		14 1/2¢ per lb.			
1 to 1 1/4 in. x 1/4 in.....		Copper Wire—			
1 to 1 1/4 in. x 1/4 in.....		Base Price.....			
1 to 1 1/4 in. x 1/4 in.....		Carload lots mill 13 1/2¢			
1 to 1 1/4 in. x 1/4 in.....		Copper Sheets—			
1 to 1 1/4 in. x 1/4 in.....		Sheet Copper Hot Rolled, 16 oz (quantity lots) 18¢			
1 to 1 1/4 in. x 1/4 in.....		Sheet Copper Cold Rolled, 1¢ advance over Hot			
1 to 1 1/4 in. x 1/4 in.....		Rolled.			
1 to 1 1/4 in. x 1/4 in.....		Sheet Copper Polished 20 in. wide and under, 1¢			
1 to 1 1/4 in. x 1/4 in.....		square foot			
1 to 1 1/4 in. x 1/4 in.....		Sheet Copper Polished over 20 in. wide, 2¢			
1 to 1 1/4 in. x 1/4 in.....		square foot			
1 to 1 1/4 in. x 1/4 in.....		Polished Copper, 1¢ square foot more than Polished.			

## NICHOLSON

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